This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

Digitized by Google

AME 0564.a

V-12

532
2L-18

HARVARD UNIVERSITY.

LIBRARY

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY.

3599

Bought

May 26, 1885 — April 30, 1886.

Digitized by Google

Digitized by Google

Digitized by Google

21-13

TRANSACTIONS

OF THE

AMERICAN

ENTOMOLOGICAL SOCIETY.

AND

PROCEEDINGS

OF THE

ENTOMOLOGICAL SECTION

OF THE

ACADEMY OF NATURAL SCIENCES.

VOL. XII.

PHILADELPHIA:
GEORGE B. CRESSON, ENTOMOLOGICAL PRINTER.
1885.

Digitized by Google

Digitized by Google

LIST OF PAPERS.

PAGE.

AARON, S. FRANK.
The North American Chrysididæ 209

ASHMEAD, WM. H.
A Bibliographical and Synonymical Catalogue of the North American Cynipidæ, with description of new species . 291
On the Cynipidous Galls of Florida, with descriptions of new species v
Studies on the North American Chalcididæ, with descriptions of new species from Florida x

BLANCHARD, FREDERICK.
On the species of Canthon and Phanæus of the United States, with Notes on other genera 163

HAGEN, Dr. H. A.
Monograph of the earlier stages of the Odonata, sub-families Gomphina and Cordulegastrina 249

HORN, GEO. H., M. D.
A study of some genera of Elateridæ 33
A study of the species of Cryptobium of North America. 85
Studies among the Meloidæ 107
Descriptions of new North American Scarabæidæ . . 117
Contributions to the Coleopterology of the United States, No. 4 128
Descriptions of some new Cerambycidæ with notes . . 173
Synopsis of the Throscidæ of the United States . . 198

LECONTE, JOHN L., M. D.
Short studies of North American Coleoptera, No. 2 . 1

SMITH, JOHN B.
Notes on the Systematic position of some North American Lepidoptera 77

WILLISTON, S. W., M. D.
On the North American Asilidæ, Part 2 . . . 53

Digitized by Google

Digitized by Google

PROCEEDINGS
OF THE
MONTHLY MEETINGS
OF THE
ENTOMOLOGICAL SECTION
OF THE
ACADEMY OF NATURAL SCIENCES,
PHILADELPHIA.

JANUARY 26, 1885.

Director Dr. HORN in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Entomologists' Monthly Magazine, vol. i. By purchase.

Entomologists' Monthly Magazine, No. 248, January, 1885. From the Conductors.

Proceedings of the Zoological Society of London, 1884, part 1. From the Society.

Proceedings of the Linnean Society of London, November, 1882, to June, 1883. From the Society.

Journal of the Linnean Society of London, vol. xvii, Nos. 101, 102. From the Society.

Canadian Entomologist, vol. xvi, Nos. 8–11. From the Editor.

Proceedings of the Boston Society of Natural History, vol. xxii, part 4. From the Society.

Proceedings of the Academy of Natural Sciences of Philadelphia, 1884, part 2. From the Academy.

Bulletin of the Brooklyn Entomological Society, vols. 1–7. From the Society.

Butterflies of North America, by Wm. H. Edwards, second series, part 13. From the Author.

Contributions to the descriptive and systematic Coleopterology of North America by Thos. L. Casey. From the Author.

Berliner Entomologische Zeitschrift, vol. xxviii, part 2. From the Society.

Note sur les Glomérides de la Belgique, par A. P. de Borre. From the Author.

Biologia Centrali Americana.—Coleoptera, vol. i, part 1, index; vol. iii, part 2, pp. 225–272; vol. iv, part 1, pp. 57–88, 3 plates; vol. 5,

Digitized by Google

supplement, pp. 225–248, 1 plate; vol. 6, pt. 1, pp. 321–336, 2 plates. Hymenoptera, pp. 129–144, 1 plate. Lepidoptera Rhopalocera, vol. i, pp. 353–360. Lepidoptera Heterocera, vol. i, pp. 89–112, 2 plates. Rhynchota, pp. 297–304, 2 plates. By purchase.

Communication No. 181 was read and referred to the Committee on Publication.

The Conservator reported that specimens lately in the hands of specialists had been returned to the cabinet.

February 23, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Canadian Entomologist, vol. xvi, No. 12. From the Editor.

Papilio, vol. iv, Nos. 7–8. From the Editor.

Journal of the New York Microscopical Society, vol. i, No. 1. From the Society.

Acronycta betulæ, n. sp. by C. V. Riley. From the Author.

Entomologist's Monthly Magazine, No. 249, February 1885. From the Conductors.

The Publication Committee reported in favor of the publication of a paper entitled: On the Systematic Position of certain Lepidoptera, by John B. Smith.

Communication No. 182 was read and referred to the Publication Committee.

The Conservator reported progress in the work on the general collection.

Dr. Horn illustrated by drawings the presence of sexual differences in sculpture on the under side of the prothorax of Stenosphenus, and explained their utility as an aid in the separation of species.

During a discussion on the subject the prevailing opinion of the members seemed to be favorable to the use of Naphthaline as a protective means in cabinets.

March 23, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Canadian Entomologist, vol. xvii, Nos. 1–2. From the Editor.

Digitized by Google

Pysche, vol. 4, Nos. 126–129. From the Editor.

Report of the Entomologist for the year, 1884, by C. V. Riley. From the Author.

General Truths in applied Entomology, by C. V. Riley. From the Author.

Contribucion a la Entomologia Cubana, by J. Gundlach. From the Author.

Tentamen Catalogi Glomeridarum, hucusque descriptarum, par A. P. de Borre. From the Author.

The Publication Committee reported in favor of the publication of a paper entitled: Descriptions of some new Cerambycidæ, with notes, by George H. Horn, M. D.

Dr. Horn exhibited a series of all the North American species of Monilema and explained the characters made use of by him in their separation. The structural differences which may cause Collapteryx to be considered a valid genus were dwelt upon.

A proposition for membership was read and laid over.

April 27, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Entomologica Americana, vol. 1, No. 1. From the Editor.

Entomologist's Monthly Magazine, Nos. 250–251. From the Conductors.

Entomologisk Tidskrift, Haft 3–4, 1884.

Transactions of the Scientific Association, Meriden, Conn., vol. 1. From the Association.

Communication No. 183 was read and referred to the Publication Committee.

The Director urged that the matter receive the immediate attention of the Committee, whereupon the Committee after consideration reported favorably on the communication entitled: On the species of Canthon and Phanæus of the United States, with notes on other genera, by Frederick Blanchard.

On motion of Mr. Blake it was resolved to change the night of meeting from the fourth Monday to the fourth Thursday.

Mr. S. Frank Aaron was elected a member.

The Custodian's report for March was read.

Digitized by Google

May 21, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Entomologist's Monthly Magazine, No. 252. From the Conductors.

Canadian Entomologist, March, 1885. From the Editor.

Entomologica Americana, vol. i, No. 2. From the Editor.

Proceedings of the Academy of Natural Sciences Philadelphia, 1885, part 1. From the Academy.

Memoirs of the Boston Society of Natural History, vol. iii, No. 11. From the Society.

Transactions of the Entomological Society of London, 1884. From the Society.

On the affinities and classification of Paleozoic Hexapoda, and winged insects from a paleontological point of view, by S. H. Scudder. From the Author.

New genera and species of fossil Cockroaches, by S. H. Scudder. From the Author.

Orange Insects, by W. H. Ashmead. From the Author.

Communication No. 184 was read and referred to the Publication Committee.

Communication No. 185 was similarly referred.

Report of the Custodian for April was read.

June 25, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:—

Canadian Entomologist, April 1885. From the Editor.

Proceedings of the Zoological Society of London, 1884, part 4. From the Society.

Journal and Proceedings of the Royal Society of New South Wales, 1883. From the Society.

Annales de la Societé Entomologique de France, 1883. From the Society.

Entomologische Zeitung, herausgegeben von dem Entomologischen Vereine zu Stettin, 1884. From the Society.

Entomologist's Monthly Magazine, June 1885. From Conductors.

Digitized by Google

The Periodical Cicada, 1885, C. V. Riley. From the Author.

Revision des armures copulatrices des máles de la Fam. de Mutillides, par Radoszkowski. From the Author.

The Publication Committee reported favorably on the following papers read at the meeting in May:

The Cynipidous Galls of Florida, No. 4, by Wm. H. Ashmead—for publication in the Proceedings of the Section, inasmuch as the preceding shorter papers had been so published.

Synopsis of the Throscidæ of the United States, by George H. Horn, M. D., for publication in the Transactions.

Report of the Custodian for May was read.

Communication No. 186 was read by title and referred to the Publication Committee.

On motion the Section adjourned until September.

On the CYNIPIDOUS GALLS of Florida with descriptions of new species.

BY WILLIAM H. ASHMEAD,

Jacksonville, Florida.

(Paper No. 4.)

My studies on the Cynipidous galls of Florida, although continued during the past four years, have been more or less interrupted by pressing business engagements, yet they have resulted in revealing many new and interesting forms which I now desire to bring to notice.

Galls on the Live Oak.—*Quercus virens.*

The fig gall, first noticed as occurring on this tree by Baron Osten Sacken and mentioned in my first paper as probably identical with *Cynips q. ficus* Fitch, proves to be an entirely different species.

For a long while I was unable to breed anything from it but Inquilines, Figites and Chalcides.

Having procured fresh specimens in the fall of 1883 I was more fortunate, and at last bred the gall maker.

Digitized by Google

These galls, although externally resembling *Cynips q. ficus* or more properly *Cynips q. forticornis* Walsh, are structurally different. Dr. Fitch says: "hollow bladder-like galls of the pale dull yellow color of a faded oak leaf."

The Live Oak fig galls are not hollow, and are hard and difficult to cut.

The Live Oak Fig Gall.

Cynips q. ficigera n. sp.

Galls.—In clusters thickly crowded together around a limb, compressing each other and shaped accordingly; outwardly resembling compressed figs, of a yellowish brown color; interiorly hard and surrounding a smooth oval kernel, which is plainly visible on detaching a gall, a part of the kernel being imbedded in the twig, and when detached it leaves an indentation in the twig.

Gall-fly.— ♀. Length .15–.17 inch. Color reddish brown. Head and thorax finely rugosely punctate; head, thorax, coxæ, legs and first abdominal segment densely pubescent; eyes dark brown; antennæ rather long 14-jointed, third joint long, others to seventh sub-equal; parapsides distinct; abdomen above dark brown, beneath lighter; tibial spurs on fore legs; wings hyaline, veins yellowish; radial vein apparently closed, but the submarginal is not prolonged along the costal edge; areolet almost closed.

Described from several ♀ bred specimens. No males.

The above is easily distinguished from *Cynips q. forticornis* (the males of Dr. Fitch's fig gall,—*Cynips q. ficus* Fitch, being an Inquiline, and placed by Baron Osten Sacken in Ceroptes), by its much larger size, that being in length but .07–.10 inch and by the color of the abdomen, *C. forticornis* being black.

The Live Oak Globular Gall.

This small globular gall grows on the young live oak trees close to the ground, seldom over a foot and a half from the ground.

Cynips q. omnivora n. sp.

Galls.—Hard, pale brown, globular, hollow galls, varying in size from five-twelfths to three-quarters of an inch in diameter; growing separately or two and three together from the bud axil of a twig.

The rind is hard and tough and of an inch or more in thickness; in the hollow part is found a small, smooth, hard, oval kernel, .15 inch in length, sometimes loose, but more often attached to the hull near the bud axil.

Digitized by Google

Gall-fly.— ♀. Length .20 inch. Reddish brown, coarsely rugosely punctate and clothed with long gray pubescence, pubescence is longer and thicker on head back of eyes, episternum, pleura and first abdominal segment. Head small, darker than body, very finely rugoso-punctate on vertex back of eyes; a series of coarse grooves converging towards and around the mouth; antennæ 14-jointed, third joint longer than first and second combined; scutellum elevated, bifoveolate; legs finely rugoso-punctate, brown and very pubescent, femora darker; abdomen dark brown, smooth and shining, first segment more densely pubescent on upper surface, and entended in short pubescence to tip, beneath smooth; wings hyaline, radial area open, the radial vein, however, almost touches the outer edge, areolet three-fourths closed, veins brownish.

Described from three ♂ specimens taken from old galls.

It is exceptional to find the same gall growing on different species of oak, especially widely different species, but the above species seems to live on all. I have found it on *Quercus virens*, *Q. Catesbæi* and *Q. cinerea*.

Another gall on the Live Oak, found on the under side of the leaves, growing frequently along side *Cynips q. lanigera* has been known to me for some years, but I have been unsuccessful in breeding the gall maker until this spring.

Cynips q. minutissima n. sp.

Galls.—Small, minute galls, a little larger than a pin's head, on the under side of the leaves of *Quercus virens* and covered with coarse, brown, mossy pubescence; diameter; diameter of gall with pubescent growth .05–.10 inch. Sometimes there are several galls together.

Gall-fly.— ♀. Length .04–.05 inch. Black, smooth and shining, but showing faint delicate aciculations under a high power lens. Antennæ 14-jointed, yellowish brown, third joint longest; legs yellowish brown, femora infuscated along upper surface; wings hyaline, veins yellowish, radial area open, the tip of subcostal just touches outer edge, but is not thickened along the edge, radial vein reaches the margin; areolet obliterated; abdomen black shining, triangular in outline with prominent ovipositor sheaths.

Described from four ♀ bred specimens.

GALLS ON THE WILLOW OAK,—*Quercus laurifoliae.*

A round or spherical gall drops from the large trees of this oak in August, and I have been unable to find out whether they grow on the twigs or on the leaves.

Although the galls are common, the gall-fly is yet hard to raise, and the description is made from several discovered in boxes of the galls put away in 1881.

Cynips q. fuliginosa n. sp.

Galls.—Brown, mottled, globular galls, .35 inch in diameter, hard, of a fine corky texture with a central kernel.

Digitized by Google

Gall-fly.— ♀. Length .20 inch, black. Head and thorax rugosely punctate, pubescent; eyes brown; antennæ 13-jointed, short, pubescent, black, third joint as long as one and two combined, mesothorax bulging, no parapsidal grooves; scutellum bifoveolate; abdomen smooth, black, second segment occupying the whole upper surface, the others are telescoped inside it; wings fuliginous, radial area almost closed, areolet open.

Described from nine ♀ bred specimens.

This is somewhat similar to the gall *Cynips q. globulus* Fitch, but there is not a particle of resemblance between the flies.

Galls on Cinereous Oak,—*Quercus cinerea.*

Close observations of this oak, from the falling of the leaves to the budding of the new leaves in early spring, result in the discovery of several interesting galls as diffuse in character and structure as one could imagine.

The gall makers of some of these I describe below; others on account of the great difficulty in breeding, yet remain unknown.

Cynips q. medullæ n. sp.

Galls.—A gradual swelling surrounding a branch or twig from an inch and a half to three inches in length, and from half an inch to one inch in diameter; internally hard and woody, the larvæ living with heads imbedded in the pith or heart of the twig and the wood swells above them.

Gall-fly.— ♀. Length .12 inch; Reddish brown, rugoso-punctate; *head wider than thorax*, more finely rugosely punctured on vertex, deep grooves converging towards mouth, mandibles black, a few short appressed hairs back of eyes; antennæ 14-jointed, subclavate, first joint thickened at tip, second short, third as long as first, thence to seventh subequal, the remaining joints about equal in length but widening at tip; parapsides distinct, the meso-scutum also has a central median groove which becomes faint anteriorly, pleura grooved; scutellum rugoso-punctate, bifoveolate; abdomen red-brown, smooth and shining; legs reddish brown; wings hyaline, very pale, with yellowish tinge, *radial area and areolet entirely obliterated.*

An easily recognized species. Described from four ♀ bred specimens.

This species seems to be greatly depredated upon by a *Figites*, out of many galls all produced parasites but those above recorded.

The gall-fly of another species affecting this oak I have just succeeded in raising this spring, after many previous ineffectual attempts.

The galls appear in early spring and are soft, bristly and sticky. The immaturity of the specimens was probably the cause of my not succeeding before.

The fly does not appear until the following year, February and March.

Digitized by Google

Cynips q. gemmaria n. sp.

Galls.—Numerous, small, oblong, bud-like galls, surrounding a twig or sometimes issuing from the sides of the larger branches, .10–.12 inch in length by .05 inch in diameter.

Fly escapes by perforating a hole in the side.

Gall-fly.— ♀. Length .06–.07 inch. Black, opaque, head and thorax rugosely punctate, punctuation on head very coarse, coarser than on thorax; antennæ 14-jointed, reddish, third joint longest, terminal joint longer than penultimate, with indications of a division, mouth parts reddish yellow; legs reddish, slightly pubescent, femora dark; parapsidal grooves distinct, scutellum very coarsely rugoso-punctate; wings hyaline, veins yellowish, radial area open, the tip of subcostal touches the costal edge; areolet almost entirely obliterated; abdomen black, smooth and shining.

Described from thirty ♀ bred specimens.

The following rare gall appears early in April, for a long time my efforts to obtain the gall maker were unsuccessful, as it takes them over a year to develop:

Cynips q. capsuala n. sp.

Galls.—Clusters of from fifteen to thirty elongate ovate, greenish yellow galls, surrounding a terminal twig, sharpened to a point at one end and easily detached.

At first this gall is fleshy, exactly resembling a green fig, and is covered with a fine silky pubescence.

When dry the gall is hardly recognizable; externally it is longitudinally ribbed; interiorly it is divided into twelve longitudinal parchment partitions attached to a central kernel like certain Papaveraceous seed pods.

Gall-fly.— ♀. Length .14 inch. Head and thorax black opaque, coarsely rugose, head as wide as thorax, short; just back of the ocelli are a number of coarse, deep, transverse rugosities; ocelli brown, vertex coarsely rugoso-punctate, face more finely punctate, two lines or shallow grooves start on vertex between the eyes converging anteriorly to a point just at base of antennæ, forming with the vertex a perfect triangle; antennæ very close together, 15-jointed, yellowish red third and fourth joints equal in length, about as long as first and second combined, joints 5–6–7 subequal, following joints about equal, terminal joints slightly longer, mandibles black; thorax coarsely rugose, a median groove on mesoscutum which does not quite reach the collare, two short grooves start from collare and run back posteriorly to not quite the middle of mesothorax, between the median groove and the parapsides, the latter distinct; scutellum of normal size, oval, bifoveolate and coarsely rugose, pleura longitudinally grooved with punctures at bottom of the grooves; legs yellowish red, sparsely pubescent, coxæ black; wings hyaline, veins yellowish, radial area open, the tip of subcostal does not reach the costal edge, areolet obliterated.

Described from seven ♀ specimens.

The above gall has also been found growing in one instance on *Q. Catesbæi.*

Digitized by Google

Studies on North American CHALCIDIDÆ, with descriptions of new species from Florida.

BY WILLIAM H. ASHMEAD.

Jacksonville, Florida.

(Paper No. 5.)

Sub-family—CHALCIDINÆ.

SMICRA Spinola.

Since the publication of my other papers on the Florida Chalcididæ I have taken here and identified of this genus *Smicra rufofemorata* and *S. delira*, described by Mr. E. T. Cresson from specimens received from Texas; also *S. delumbis*, Cresson, heretofore taken only in Massachusetts and Delaware.

The following species are apparently as yet undescribed:

1. **Smicra vittata** n. sp.

♀.—Length .25–.27 inch. Lemon yellow. Eyes and ocelli brown; antennæ brown-black with the exception of scape, which is lemon yellow beneath. A broad medio-longitudinal stripe on thorax extending from collar back to near the apex of scutellum, where it becomes somewhat narrower; mesoscutum at sides narrowly margined with brown; collar laterally, and pleuræ at base edged with brown. The posterior coxæ have a broad brown stripe along the upper edge. Abdomen yellow, acuminate and slightly compressed: the upper surface is slightly dusky with the extreme tip or apex black; the petiole is short. Femoral teeth nineteen, minute and black; wings dusky hyaline.

An easily recognized species, approaching nearest to *S. mirabilis*, Cresson. Described from two ♀ specimens captured at large.

2. **Smicra hirtifemora** n. sp.

♂.—Length .10 inch. Honey yellow. Eyes, flagellum and a median stripe on thorax extending from collar to scutellum, brown. Femoral teeth fifteen, small and black: the posterior femora are clothed outwardly with a close, fine, silky pubescence. The petiole is slightly longer than half the length of the posterior coxæ, and the upper surface of abdomen is slightly fulvous; wings hyaline.

Described from one ♂ specimen captured at large.

3. **Smicra longipetiola** n. sp.

♂.—Length .14 inch. Honey yellow, coarsely punctate. Eyes and ocelli dark brown. Antennæ long, reaching to tip of scutellum, fulvous, with pale yellow scape. The mesoscutum along the edge at base and a wide medio-longitudinal band extending from collar to scutellum brown; parapsides along the grooves and

Digitized by Google

scapulæ at base brown. The disc of scutellum is brown, and there is a brown spot on either side of the metascutum. The petiole is very long, longer than the posterior coxæ, or twice as long as the abdomen. The abdomen is brown, excepting at base and apex. The posterior femora are very large, larger than the abdomen, and with a large brown blotch on the whole upper surface: the teeth are twelve, minute and black; wings hyaline, veins pale brown.

Described from one ♂ specimen captured at large.

CHALCIS Fabricius.

Mr. E. T. Cresson described *Chalcis coloradensis* from Colorado, and I have recently taken a specimen in Florida. Colorado is probably its extreme northern faunal limit, and it will undoubtedly prove to be a parasite on a common diurnal lepidopteron.

The following species is new, and in many of its structural characters differs widely from any known species. It will probably form the type of a new genus:

4. **Chalcis flavipes** n. sp.

♂.—Length .14 inch. Black, coarsely, deeply punctate and pubescent; ocelli shining black; eyes grayish before, brown behind. There is a broad lemon yellow band on face close to eyes and between antennæ and eyes, extending from near vertex to labrum, the latter yellow; there is also another narrow lemon yellow stripe back of eyes; the pubescence on back of head is long, white and dense. Antennæ is short, brown and densely pubescent; thorax immaculate, coarsely punctate, *with the parapsidal grooves obliterated*; the scutellum is broad, convex, coarsely punctate, and *the scapulæ are not separated from it by grooves; the metathorax is porrect, coarsely, deeply reticulate and bidentate at tip;* the abdomen is small, black, pointed, ovate, with a very short petiole, covered with whitish pubescence *and bifoveolate at base.* Wings fusco-hyaline; tegulæ yellow. Legs four, anterior pair lemon yellow, posterior pair black, with a large bright lemon yellow spot on femora above and along the edge beneath; femoral teeth numerous, small (about twenty-two); tibiæ very greatly curved, with a yellow spot at tip.

Described from one specimen captured at large. This species is markedly different from any species known to me, and is very easily recognized.

Sub-family—EUCHARINÆ.

THORACANTHA Latreille.

5. **Thoracantha floridana** Ashmead.

In "Entomologica Americana" for August, page 95, I gave a short account of the discovery of this interesting Chalcis, the first of the genus discovered on the North American Continent.

The description was made from one male specimen taken while feeding on the flowers of the gall berry *Ilex glaber*. Since then I have taken twenty-two specimens: four males and eighteen females, and the female differs in many respects from the male. I give here descriptions of both sexes.

Digitized by Google

♂.—Length .17–.20 inch. Black, with a slight æneous tinge in certain lights. Head small, triangular, rugoso-punctate and generally held horizontally beneath the enormously developed thorax. Eyes moderate, oblong oval; mandibles large, curved and 4-dentate. Antennæ shining black, 12-jointed, 9-branched, scape moderately long, cylindrical, 2d large, globular, 3d to 11th short, slightly widened and truncate at tip, each emitting a long, sparsely pubescent, subclavate branch; 12-joint very long, about same size as the antennal branches, and making the antennæ apparently 10-branched; thorax high, enormously developed and transversely rugose on prothorax, mesothorax longitudinally rugose, sparsely covered with short pubescence; parapsides wide apart, distinct; scutellum abnormally developed, projecting posteriorly over the abdomen in the form of two long slightly curved horns, which are longitudinally grooved. The wings are fusco-hyaline, and when at rest lie flat under the horns, the marginal vein is long, thick and brownish black, stigma a large brown-black spot with the post-marginal vein very long. Abdomen pedunculated, peduncle longer than abdomen, finely sculptured, cylindrical, slightly bent beyond the middle and thickest at base; the abdomen is very small, triangular and greatly compressed. Legs testaceous, pubescent; coxæ well developed, black, upper part of femora and upper side of tibiæ brown, two apical spurs on posterior tibiæ with one small spine on middle pair.

♀.—Length .10–.22 inch. Blue-black with æneous tinge. The antennæ are filiform and not branched; the peduncle is much shorter than in the male and the abdomen is much larger, globose, semi-globose or compressed, depending upon the quantity of fluid it contains, and varies in color from a dirty yellow to a yellow-brown, with the basal portion dusky.

One specimen was but .10 inch in length, but all the rest averaged from .20–.22 inch.

Sub-family—EURYTOMINÆ.

EURYTOMA Rossi.

6. **Eurytoma obtusilobæ** n. sp.

♀.—Length .17–.20 inch. Black, coarsely, deeply punctate and covered with long white pubescence; punctures on face coarsely, deeply reticulate. Antennæ 9-jointed, scape rufous, flagellum black, or brown-black, with the two apical joints rufous. Legs yellowish, tarsi pale. Abdomen much less pointed at apex than in *E. prunicola*, Walsh; black, polished, but with the segments beneath up to dorsal surface, finely punctured; wings hyaline.

♂.—Length .14–.16 inch. Antennæ 8-jointed, scape rufous, with a black blotch at apex above, pedicle rufous, with a black spot above, flagellum black, 1st joint longest and quite broad, peduncled at apex, other joints subequal, peduncled and furnished with two whirls of long white hairs, club as long as scape, apparently 2-jointed.

The species is quite near *Eurytoma prunicola*, Walsh, but is readily distinguished from it by the less pointed abdomen in the female and by the wide flagellar joints in the male.

Described from four specimens bred from an undetermined cynips gall on *Quercus obtusiloba*.

Digitized by Google

7. **Decatoma flavicollis** n. sp.

♂.—Length .05–.06 inch. Black, punctate, with the collar and legs lemon yellow. The upper edges of posterior femora and tibiæ brownish. Abdomen piceous, with a long petiole. Wings long, with a small stigmal spot.

♀.—Length .07–.08 inch. It differs from the male in having not only the collar, but the sutural edges dividing the mesoscutum from the scutellum, the head, the venter and the sides of abdomen, yellow. There is a brown blotch on the vertex of head and collar, and on the middle portion of the posterior coxæ.

Described from several specimens bred from an undescribed Cynips gall.

Sub-family—TORYMINÆ.

CALLIMOME Spinola.

8. **Callimome lividus** n. sp.

♀.—Length .10 inch; ovip. .06 inch. Deep blue. The space back of eyes and face above mouth, metallic green; apical portion of scutellum and metathorax, smooth, not punctured: legs rufous with femora above blue; tarsi honey yellow. The two apical abdominal segments are green and the ovipositor is black, excepting a pale spot at base.

Described from two specimens captured at large.

9. **Callimome dryorhizoxeni** n. sp.

♀.—Length .15 inch; ovip. .10 inch. Golden green, finely transversely punctate and covered with short white pubescence; face and labrum black, finely transversely sculptured; antennæ black, with scape rufous; legs honey yellow, with femora and the upper edges of tibiæ brown; abdomen brassy brown; tarsi pale; wings hyaline, with yellowish veins.

Described from four ♀ specimens bred from Cynips gall *Dryorhyoxenus floridanus* Ash.

10. **Callimome melanoceræ** n. sp.

♀.—Length .14 inch; ovip. .19 inch. Metallic green, finely punctate. The face from antennæ to mandibles is finely sculptured, and there are also a lot of coarse deep punctures, besides a not very prominent carina extending from labrum to between the antennæ. The antennæ is black with a yellowish brown; the apical third of scutellum is divided by a transverse suture; legs honey yellow, femora metallic green, bluish along upper edges and at base; abdomen finely sculptured, metallic green with bluish and metallic reflections; ovipositor unusually long, black.

Described from one ♀ specimen bred from Cynips gall *Cynips melanocera* Ashmead mss.

11. **Callimome citriformi** n. sp.

♀.—Length .15 inch; ovip. .22 inch. Metallic green and resembles *C. melanoceræ*, but is more robust and with the sculpture very much larger and coarser. The scutellum is divided by a suture, but with a margin posteriorly and coarsely punctured along its base, the sculpture on the scapulæ is longitudinally wavy; tegulæ yellow; the face is larger and broader than in *C. melanoceræ*, finely strigose, but with the large coarse remote punctures as in that species; mandibles black; antennæ ferruginous, not pubescent, and the joints of the flagellum connately

Digitized by Google

joined and finely punctured with greenish punctures; scape yellowish; legs yellowish with tarsi white; anterior and middle femora brown, more or less brassy and purplish above and at base; posterior femora and coxæ coarsely reticulate. metallic green and purplish; abdomen brassy beneath and above but purplish at base and reticulate; wings hyaline, veins yellowish.

Described from one ♀ specimen bred from gall *Cynips citriformis* Ash. It also resembles *Callimome elegantissima* Ash., but that species is readily distinguished from it by its much larger, coarser and deeper punctures, and its more brilliant color.

ORMYRUS Westwood.

12. **Ormyrus dryorhizoxeni** n. sp.

♀.—Length .14 to .20 inch. Dark blue, including coxæ and sparsely pubescent. Head small, transversely rugose; eyes red-brown; antennæ 13-jointed, as long as thorax, basal two-thirds of scape yellowish, apical portion, pedicel and following joints black; parapsides indistinct, mesoscutum punctate and transversely rugose; scutellum twice as long as broad and somewhat conical; legs red, with yellowish tarsi; posterior tibial spur two-thirds as long as first tarsal joint, yellowish; wings hyaline, with yellowish veins; abdomen acuminate ovate, second dorsal segment short; third, with one row of coarse punctures at base, fourth, with three rows; fifth, punctures smaller.

Described from twenty-two ♀ specimens bred from gall *Dryorhizoxenus floridanus* Ash.

13. **Ormyrus rosæ** n. sp.

♀.—Length .12 to .22 inch. Bright, shining, metallic green, with purplish reflections and more or less bluish or purplish on mesothorax and abdomen and very finely transversely sculptured. Head transverse, ocelli red-brown; eyes brown; antennæ 13-jointed, pubescent, scape long, with basal portions of pedicel yellowish, flagellum black; thorax: collar short, brassy, with purplish tinge; mesoscutum broad, with parapsidal grooves indistinct; scutellum long, convex, elevated posteriorly and with very fine longitudinal scratches; scapulæ brassy; sternum cupreous, pleuræ cupreous; abdomen acuminate, brassy, with purplish reflections, segments 3, 4 and 5 with coarse punctures; legs yellowish; coxæ brownish, upper surface of posterior femora infuscated; wings hyaline.

Described from specimens bred 1881 from gall *Rhodites ignota* O. S.

14. **Ormyrus labotus** Walker.

Ann. Soc. Ent. Fr. 2nd Ser. 1 p. 148.

I have bred an Ormyrus from *Cynips ficigera* Ash., which agrees tolerably well with Mr. Walker's description of this species.

Sub-family—EUPELMINÆ.

EUPELMUS Dalman.

15. **Eupelmus hirtus** n. sp.

♀.—Length .12 inch. Metallic green very rugose-punctate. Head broader than thorax, face and space back of eyes covered with short white pubescence;

Digitized by Google

eyes brown; antennæ 13-jointed, long, subclavate, obliquely truncate at tip, pubescent, scape reddish brown, pedicel and flagellum black; thorax and abdomen covered with short white pubescence above, beneath and at sides, the large convex plate beneath wings alone excepted; mesothorax depressed, or concave, with a medio-longitudinal ridge posteriorly and a depression on either side; scutellum flattened; abdomen short broadened posteriorly and sub-truncate at tip with the ovipositor slightly exserted, strongly keeled beneath and black or blue-black, depending upon the light and more or less testaceous at base; legs: anterior pair above dark brown or black, coxæ with first tarsal joint testaceous, other tarsal joints darker, middle and posterior legs dark brown with coxæ, knees apices of tibiæ and the tarsi pale testaceous, middle tibial spur long and white; wings hyaline, with two broad transverse brown bands, the upper or apical one more or less suffusing the whole tip of wing.

♂.—Length .10 inch. It differs from the female as follows: antennæ of nearly a uniform size throughout, filiform, with the pubescence longer and denser; mesothorax not depressed but convex, and the wings are clear hyaline without bands; the front legs are pale yellowish with the upper surface of the middle femora and tibia black, tibial spur as long as first and second tarsal joints combined, hind femora and upper half of tibia black; abdomen blue-black

Described from several specimens bred from the eggs of *Thyanta custator* Fab.

16. **Eupelmus mantis** n. sp.

♀.—Length .13 inch. Head slightly wider than thorax rugosely punctate, metallic green, with purplish reflections and sparsely pubescent; antennæ long, subclavate; scape long, brown; pedicel short, black; flagellum dark brown; collar short, narrowed before; mesoscutum convex, rounded before, with a broad longitudinal depression posteriorly towards scutellum; scutellum convex, pointed posteriorly; wings fuliginous, with a white transverse band before the base of the stigmal vein; legs brown, the upper edge of tibiæ of a darker shade, tarsi pale.

♂. Length .10 inch. Metallic green, punctures not so pronounced as in female, strigose beneath the eyes and converging towards mouth; mesoscutum not depressed, the scutellum is smoother: abdomen purplish, with greenish metallic reflections: wings hyaline, but strongly iridescent; legs: trochanters white, femora brown shading into white at knees: tibiæ at apices and beneath white, brown along upper edge and at base, tibial spur long and slender, about the length of first tarsal joint, tarsi white, ungues dark.

Described from six specimens, four females and two males, bred from the eggs of *Mantis carolina*.

17. **Eupelmus conigeræ** n. sp.

♀. Length .20 inch: ovip. .07. Thorax with legs and ovipositor a uniform red-brown: head brassy, darker on face, finely rugose and slightly pubescent; antennæ black, scape yellowish; abdomen shining blue-black; wings hyaline, with a broad fuliginous band extending from a third the length of wing to near apex; extreme tips hyaline.

An easily recognized species, described from one ♀ bred May, 1881, from gall *Cynips conigera* Ash.

Digitized by Google

Sub-family—ENCYRTINÆ.

ENCYRTUS Dalman.

18. **Eupelmus lachni** n. sp.

♀.—Length .08 inch. Bright golden green; abdomen cupreous; head large, much wider than thorax, finely transversely rugoso-punctate with grooves on face converging towards mouth; antennæ inserted on middle of face, 11-jointed, brown and thickly pubescent; scape slightly flattened, fulvous; pedicel rounded, smooth, black; other joints wider and covered with white pubescence; thorax punctate, scutellum more finely punctate with a transverse ridge separating the posterior portion; wings hyaline, veins brown, marginal vein hardly as long as stigmal, the latter ending in a toothed knob, postmarginal vein very long; legs: coxæ black with metallic reflections, middle portion of femora brown, tibiæ and tarsi white, or very pale yellowish; abdomen with a row of hairs along upper edge of segments.

Described from four ♀ specimens bred from pine aphis *Lachnus australis* Ash.

19. **Eupelmus schizoneuræ** n. sp.

♀.—Length .06–.08 inch. Head and thorax beneath blue-black, polished and sculptured, slightly pubescent, mandibles 2-dentate; eyes large, brown; antennæ 11-jointed, pubescent; scape long, black, shining; pedicel cyathiform, other joints slightly flattened and becoming thicker towards tip; mesothorax and scutellum brassy, sparsely pubescent; abdomen dark with metallic reflections; legs honey yellow, with the femora, excepting at tips, black; middle tibial spur as long as first tarsal joint; wings hyaline, marginal vein slightly longer than stigmal, the latter toothed at tip.

♂.—Length .05 inch. Agrees with the female, excepting the antennal joints are not so wide, and the longer pubescence, while the marginal vein is very short.

Described from several specimens bred from Aphis *Schizoneura aquaticæ* Ashmead mss.

20. **Eupelmus albocinctus** n. sp.

♀.—Length .08 inch. Piceous black; eyes brown; antennæ brown, scape flattened, pedicel not quite as long as first and second funicular joints combined, but stouter, funicle 5-jointed, joints subequal, club large and hairy, as long as joints one, two, three and four combined; thorax and scutellum microscopically longitudinally strigose; collar very short; mesothorax convex, parapsides distinct; scutellum convex, with two distinct longitudinal grooves; abdomen subsessile, segments one and two and part of third white, following segments black; legs white, front pair slightly yellowish, femora slightly flattened; wings hyaline, submarginal vein short, marginal vein long, stigmal very short.

Described from specimens bred from an undescribed Cynips gall on *Quercus dentatus*.

COMYS Forster.

21. **Comys albicoxa** n. sp.

♀.—Length .07 inch. Head and thorax rust red with white pubescence, finely transversely sculptured, with some large, remote punctures on head; eyes brown,

Digitized by Google

palpi black; antennæ 11-jointed, long, pubescent; scape long, slightly curved and slightly dilated, white except at tip; pedicel long it and following joints black, each joint flattened and gradually widening towards club; thorax collar black, mesothorax, scutellum and pleuræ microscopically longitudinally strigose; scutellum has, towards tip, a tuft of coarse, black bristles arranged in two rows; abdomen black, or blue-black, brassy beneath and with a few long hairs at sides; all coxæ are pure white, front femora white, tibiæ honey yellow, brownish at tips, tarsi yellowish white, middle femora, tibiæ and tarsi honey yellow, hind femora, tibiæ and tibial spur dark brown, tarsi excepting basal portion of first joint white, ungues dusky; wings brown, with a narrow white transverse band below base of stigma.

The ♂ is very similar to ♀, excepting the antennal joints are not gradually widened towards tip, and the extreme tip of club is sometimes white or pale; the mesothorax is slightly depressed and the abdomen is more decidedly blue.

Described from several specimens bred from Coccid *Dactylopius adonidum* Linn.

Sub-family—PTEROMALINÆ.

SEMIOTELLUS Westwood.

22. **Semiotellus ficigeræ** n. sp.

♂.—Length .10 inch. Metallic green, shallowly punctate and covered with short, white pubescence; head much wider than thorax, face finely grooved, the grooves converging towards mouth; antennæ 11-jointed, scape yellow, pedicel black, densely flagellar joints pubescent and difficult to determine; thorax: collar very short, hardly visible from above; parapsidal grooves obliterated; scutellum is more finely punctate than the mesoscutum, with the scapulæ still less punctured, being almost smooth and somewhat æneous; abdomen black, smooth and shining, with first segment above brassy green; legs black with tips of femora, tibiæ and tarsi pale, almost white; wings hyaline, veins brownish, stigma very long, stigmal vein long, clavate at tip and with a very long postmarginal vein.

♀.—Length .12–.14 inch. Dark metallic brown, sparsely covered with short, stout, white pubescence and very uniformly punctate; head broader than thorax; eyes prominent, punctures on face very uniform, but becoming smaller towards mouth, presenting a somewhat granulated appearance under the microscope; labrum black; antennæ black, scape fulvous, parapsidal grooves indistinct, extending obliquely only half way on mesoscutum; legs yellowish, tibiæ and feet pale, ungues brown, with the hind femora brown and metallic green above; abdomen pointed, ovate, very dark metallic green, with the segments finely sculptured with undulations; wings hyaline, veins brown, marginal vein two-thirds the length of submarginal, postmarginal is half the length of marginal and the stigmal ends in a large knob.

In some specimens the upper surface of middle and anterior femora is brown.

Described from specimens bred May, 1881, from gall *Cynips ficigera* Ash.

Digitized by Google

Sub-family—ELACHRISTINÆ.

EUPLECTUS Westwood.

23. **Euplectus marginatus** n. sp.

♀.—Length .07–.09 inch. Piceous back; head transverse, finely strigose and with but few large punctures, covered with a few scattered hairs; face triangular palpi yellowish; eyes brown; antennæ, scape long, slender, slightly curved and with a well defined longitudinal groove, honey yellow; flagellum dark, with fourth joint and club pedunculated; thorax: collar very short, finely rugose; mesoscutum broad, coarsely, transversely rugose, with the median carinæ prominent; scutellum coarsely granulated and margined posteriorly; scapulæ rugose, strongly margined at sides; prosternal episternum rugose and margined, pleuræ divided by a longitudinal depression, the anterior portion of which is rugose and margined, the posterior portion smooth; legs with coxæ dark honey yellow, ungues brown; in some specimens middle coxæ and hind femora are infuscated; wings hyaline, pubescent, veins yellowish, postmarginal vein longer than stigmal; abdomen smooth, shining, black, the whole surface beneath and a spot in some specimens, on dorsum, honey yellow.

The ♂ is at once recognized by its smaller size, ovate and long peduncled abdomen, its much more hairy body and by the broad, flattened antennal scape.

Described from fifteen specimens, two males and thirteen females, bred from an unknown noctuid larva. The Chalcid larvæ were feeding externally in a mass upon the hinder part of the caterpillar, and when placed in the breeding-box abandoned it and spun loosely woven cocoons from which imagos emerged in six days.

This species is near *Euplectus Comstockii* Howard, but is at once distinguished from it by the dilated scape in ♂ and the longitudinally grooved scape in ♀.

Sub-family—EULOPHINÆ.

TETRANEMUS Westwood.

24. **Tetranemus floridanus** n. sp.

♂.—Length .08 inch. Brassy, coarsely, but not deeply punctate, sparsely pubescent; head wider than thorax, brassy and smooth around the eyes, finely grooved and with a few punctures on vertex and back of eyes, on face the grooves converge towards mouth; eyes brown; antennæ 8-jointed, brown, pubescent, scape strongly curved outward, brownish: pedicel rounded, longer than wide and stouter than scape; club subclavate, first joint bearing two pairs of long branches; thorax, collar short. narrowly pointed before; scutellum rounded, convex; prosternum brassy with transverse grooves; abdomen shorter than thorax, black with brassy tinge; legs: coxæ testaceous, middle and anterior femora light brown with edges beneath and above brown, posterior pair dark brown with greenish metallic tinge, the tibiæ are infuscated, first three tarsal joints pale, fourth with pale brown, apical spur on middle legs about as long as first tarsal joint; wings fuliginous, with a white transverse band across stigmal region; this is divided in the middle by a prolongation, pyramidal in shape, of the anterior fuliginous portion, but it does not quite reach the basal portion.

Described from one specimen taken on oak shrubs.

Digitized by Google

Sub-family—TETRASTICHINÆ.

TETRASTICHUS Haliday.

25. **Tetrastichus lecanii** n. sp.

♂.—Length .07 inch. Head yellow-brown, face deeply depressed or emarginate, with antennal grooves; head is a milky-white band extending across the face of eyes; eyes red-brown: antennæ 7-jointed, scape pale or whitish; pedicel black, joints of funicle light brown, pale at tips, almost moniliform, pedunculated and furnished with whirls of long hair; thorax and abdomen elongated, shining black and finely pubescent; collar and parts of mesoscutum shagreened, parapsides distinct; scutellum longer than broad, smooth, with two longitudinal grooves, one on either side; abdomen ovate, with a large oval white basal spot both above and beneath; legs light brown, with tips of tibiæ and tarsi pale, hind femora dark; wings hyaline, veins yellowish, marginal vein long, stigmal vein not as long as postmarginal and forked at tip.

Described from a specimen bred from a large Coccid *Lecanium* species on an aquatic shrub.

SEPTEMBER 24, 1885.

Director Dr. HORN in the chair.

Dr. Horn requested, and was granted permission to withdraw paper 186, presented at a preceding meeting.

Publication Committee reported in favor of publishing in the Transactions a paper entitled "The North American Chrysididæ," by S. Frank Aaron.

Report of the Custodian for July and August was read.

The following communication was read from W. H. Ashmead and ordered to be printed in the Proceedings: "Studies on North American Chalcididæ," No. 5.

Dr. Horn exhibited a specimen of *Hypocephalus armatus* Desm., and gave in brief some of the peculiarities of the insect, and spoke of the many dissimilar views which had been expressed concerning its position. The weight of opinion at present seemed to incline the balance toward the Cerambycidæ (in the broad sense), a cause which Dr. Horn was not yet convinced was correct.

The following additions to the Library of the American Entomological Society were announced:—

Entomologica Americana, i, 4–6. From the Editors.

Canadian Entomologist, May–Aug. 1885. From the Editor.

Entomologist's Monthly Magazine, July–Sept. 1885. From the Conductors.

Digitized by Google

Papilo, vol. iv, Nov.–Dec. 1884. From the Editor.

Psyche, Jan.–March, 1885. From the Editors.

Transactions Kansas Academy of Sciences, ix, 1883–84. From the Academy.

Proceedings Boston Society of Natural History, xxiii, Jan.–March, 1885. From the Society.

Proceedings Zoological Society of London, 1885, part 1. From the Society.

Journal Linnean Society of London, Nos. 103–108. From the Society.

Fifteenth Annual Report of the Entomological Society of Ontario. From the Society.

Matabele Land and the Victoria Falls. Appendix iv, on Entomology by J. O. Westwood, 1882. From G. H. Horn, M. D.

Le Naturaliste Canadien, xv, 1. From the Editor.

Verhandlungen Naturaliste Vereines, 1884. From the Society.

Verhandlungen der Naturforschenden Vereines in Brünn, xxii, 1–2, 1883. From the Society.

Mitteilungen Entomologischen Gesselschaft, vii, 2–3. From the Society.

Bullettnio della Societa Entomologica Italiana, 1885, 1–2. From the Society.

Berlineo Entomologische Zeitschrift, herausgegeben von den Entomologischen Verein in Berlin, 1885. From the Society.

Verhandlungen Zool.–Botan. Gesellschaft in Wien, xxxiv. From the Society.

Nederlandsch Tijdschrift voor de Dierkunde (Kerbert, Weber und Westerman) Bydragen tot de Dierkunde 10–11 Alfe. 1884.

Personen–Ort und Sach–Register, 1871–80. August Wimmer.

La destruccion de la langosta, Mexico, 1883.

The following were presented by the Royal Swedish Academy :

Aurivillius, Lepidoptera Damarensia.—Geschlechtscharaktere Nordisch Tagfalter. Kannedon.—Insektlifvet I Arktiska lauder.—Lepidoptera, Vega Expedition.

Adlerz, Myrmecologiska Studier 1, parts 1–2.

Boheman, Monographia Casididarum, 4 vols.

Fahraeus, Coleoptera Caffrariæ, 7 vols.

Hausson, Om norra Bohuslaus Ratvingar.

Holmgren, Dispositio Exochorum Scandinaviae.—Insekter frau Nordgrönland.—Skand arter af Campoplex.—Dispositio Synop. Mesoleiorum. —Beeren Eilands och Spetsb. Insekt f. Scandin.

Digitized by Google

Mäklan, Coleoptera frau Nordenskioldska expeditionen.

Newman, Sveriges Hydrachnider.–Gottlands och Olands spindlar etc. Vestergothlands Hydrachnider.

Porath, Myriopoda Africae Australis, I–II.—Om nagra Myriopoder frau Azoreina.

Reuter, Om nagra Hemipterers Dimorphism.—Capsinæ ex America Boreali-—Nya Svenska Capsider.—Skandinar. och Finlands Acanthiider. —Acanthiidae Americanae.—Skandin. och Finlands Reduviider.—Skandin och Findlands Nabider.—Nabiae Horæ.—Skandin och Findlands Aradider.—Genera Cimicidarum Europaea.—Ofversigt af Sveriges Berytidae.

Sahlberg, Bidrag till nordv Sibiren insekt fauna,—Coleoptera och Hemiptera. Vega Expid. I–III.

Spangberg, Homoptera nova.—Psocina Sueciae et Fenniae.—Species Jassi.—Homoptera Americana Nova.—Varietes Suedoises de la Brenthis. —Species Gyponae generis Homoptorum.

Stal, Bidrag till S. Afrikas Orthopter-fauna.—Orthoptera nova ex Insulis Philippines.—Genera Pentatomidarum Europae.—Genera Reduviidarum Europae.—Genera Careidarum Europae.—Lygaeidae Europae. Orthoptera nova Genera Tingitidaurm Europae.—Bidrag till Membracidermas.—Hemiptera insularum Philippinarum.—Orthoptera quaedam Africana.—Observationes Orthopterologiques I—III.—Surles caract. des Heterop. et des Homopt.—Systema Acridiodeorum.—Recherches sur les Mantides.—Recherches sur le systeme des Blattaires.—Recherches sur le Systeme des Phasmides.—Systema Mantodeorum.—Enumeratio Hemipteroum I—V.—Hemiptera Fabriciana I—II.

Stuxberg, Genera et Species Lithobioidarum.—Lithobioidæ Americae Borealis.—Myriopoder frau Sibirien Waigatsch.—Bidrag till Skandinar Myriopodologi.—Mundelarne hos Lithobius forficatus.—Nord Amerikas Oniscider.—Nya Nordamerikanska Lithobier.

Thorell, Arachnider frau Spetsbergen.—Arachnider frau Gronland.—Araneæ nonnullæ Novæ Hollandiæ.

Tullberg, Colembola borealia.—Sveriges Podurider.

Trybom. Dagfjarilar frau expeditionen till Jenisei.—Syrphusflugornas larfoer och puppor.

Wallengren, Fjarilfaunan pa St. Barthelemy.—Skandinav Pyralider och Chorentider.—Bidrag till S. Afrikas Fjarilfauna.—Insecta Transvaaliensia.—Species Tortricum et Tinearum Scandinav.—Index Specierum Noctuarum et Geometrarum Scandinav.—Auteckniugar i Entomologi.—Skandinaviens Neuroptera.

Wablberg, Insecta Caffrariae, 3 vols.

Digitized by Google

October 22, 1885.

Director Dr. Horn in the chair.

A card portrait of the late Dr. Asa Fitch was presented for the album by T. B. Ashton.

Communication 187 was read by title and referred to the Publication Committee.

Dr. Horn exhibited some sketches of various species of Chrysobothris, exhibiting some details of structure which had been apparently overlooked and dwelt on the importance of these as a means not only of separating the species, but also for arranging them in groups. A paper was promised in the near future in which these would be fully described and illustrated.

The following additions to the Library of the American Entomological Society, were announced:

Proceedings of the Zoological Society of London, 1885, part 2. From the Society.

Transactions and Proceedings of the Royal Society of New South Wales, vol. vii. From the Society.

Entomologica Americana, vol. i, No. 7. From the Editor.

Entomologist's Monthly Magazine, Oct. 1885. From the Conductors.

Le Naturaliste Canadien, Aug.–Sept. 1885. From the Editor.

Annales de la Societe Entomologigue de Belgique, vols. xxviii–xxix, part 1. From the Society.

Compte Rendu Societe Entomologique de Belgique, Sept. 1885. From the Society.

Nova Acta Regiæ Societatis Scientiarum Upsaliensis, vol. xii, 1885. From the Society.

Verhandlungen der kaiserlich-königlichen Zoologisch–botanischen Gesellschaft in Wien, 1885. From the Society.

Saggio di un catalogo Lepidotteri d' Italia, 1885.

November 26, 1885.

Director Dr. Horn in the chair.

The following additions to the Library of the American Entomological Society were announced:

Proceedings of the Academy of Natural Sciences of Philadelphia, April–July, 1885. From the Academy.

Transactions of the Connecticut Academy of Arts and Sciences, vol. iv, part 2. From the Academy.

Digitized by Google

Bulletin of the Minnesota Academy of Natural Science, 1880–1882. From the Academy.

Entomologica Americana, vol. i, No 8. From the Editor.

Psyche, vol. iv, Nos. 132–134. From the Editors.

Canadian Entomologist, October, 1885. From the Editor.

Entomologist's Monthly Magazine, Nov. 1885. From the Conductors.

Le Naturaliste Canadien, Oct–Nov. 1885. From the Editor.

Annales de la Societe Entomologique de France, Ser. 6, vol iv, 1884. From the Society.

Compte Rendu Societe Entomologique de Belgique, Oct. 1885. From the Society.

Verhandlungen Naturhist Vereines des Preuss. Rhienlands Westfalens and Reg.-Bezirks Osnatrack, 1885. From the Society.

Mittherlungen des Schweizerischen Entomologischen Gesellschaft, vol. vii, heft 4, 1885. From the Society.

Bullettino della Societa Entomologica Italiana, 1885. From the Society.

Horae Societatis Entomologicae Rossicae, vol. xviii, 1884. From the Society.

Untersuchungen der altkrystallinischen Schiefergesteine, von J. Lehmann. From the Author.

Description of an Articulate of doubtful relationship from the Tertiary Beds of Florissant, Col., by S. H. Scudder. From the Author.

On the Parasites of the Hessian Fly.—Notes on Joint Worms.—Premature appearance of the periodical Cicada.—Long Notes of the periodical Cicada.—The Imported Elm-leaf Beetle, by C. V. Riley. From the Author.

Palpes des Insectes Broyeurs, par Felix Plateau. From the Author.

December 14, 1885.

Director Dr. Horn in the chair.

The Treasurer's account for the year was submitted, showing the Receipts, including balance left over from last year, to be $139.77 and the Expenditures $54.84, leaving a balance on hand of $84.93. The account was referred for audit to Messrs. Lewis, Horn and Wilt.

Publication Committee reported in favor of publishing in the Transactions "A Monograph of the earlier stages of Odonata, sub-families Gomphina and Cordulegastrina," by Dr. H. A. Hagen.

Digitized by Google

Communications 188, 189, 190, 191 were read by their titles and referred to the Publication Committee.

Dr. Horn exhibited fragments of several specimens of *Dinapate Wrightii*, and the drawings which he had made for the lithographic artist in preparing a plate.

Mr. Philip Laurent was nominated for membership in the Society.

This being the night for the election of officers for the ensuing year, nominations were made, and upon the ballot being taken the following were elected:

Director.—George H. Horn, M. D.

Vice-Director.—Rev. Henry C. McCook, D. D.

Recorder.—James H. Ridings.

Treasurer.—E. T. Cresson.

Publication Committee.—Horace F. Jayne, M. D.; E. M. Aaron.

Custodian.—Henry Skinner, M. D.

The following additions to the Library of the American Entomological Society were announced:

Entomologica Americana, vol. i, No. 9. From the Editor.

Entomologist's Monthly Magazine, Dec. 1885. From the Conductors.

Annual Report of the Curator of the Museum of Comparative Zoology, 1884–5. From the Curator.

Compte Rendu Societe Entomologique de Belgique, Nov. 1885. From the Society.

Digitized by Google

INDEX.

The names of new genera and of new species are followed by the name of the Author.

	PAGE
Ablautatus mimus	53
Acalles costifer *Lec.*	30
sulcicollis *Lec.*	30
Acmæops viola	180
Acraspis	295
Acrisius	29
Ægilips	298
Agelastica bicolor *Lec.*	28
Agriotes	15, 19
apicalis *Lec.*	16, 18
avulsus	16
ferrugineipennis	15, 16
fucosus	15, 16
hispidus *Lec.*	16, 17
imperfectus *Lec.*	15, 16
insanus	15
limosus	15
mancus	15
montanus *Lec.*	16, 18
nevadensus *Lec.*	16, 17
oblongicollis	16
opaculus	16
pubescens	15
sparsus *Lec.*	15, 17
stabilis	15
Thevenetii	16
torquatus *Lec.*	16, 18
Allorhina mutabilis	172
nitida	172
Allotria	297
lachni *Ashm.*	302
Amphibolips	294
melanocera *Ashm.*	299
Amphichroum maculatum *Lec.*	3
Anacharis	298
Anchastus bicolor	50
frontalis *Horn*	49
militaris	49
Andrenosoma chalybea *Will.*	56
fulvicauda	56
Andricus	295
quercifoliæ *Ashm.*	299
quinqueseptum *Ashm.*	299
Androlyperus maculatus *Lec.*	28
Antistrophus	294
Aphamartania fur *Will.*	53
Aphylla producta	277
Aptopus peregrinus *Horn*	44
Asilidæ, On N. Am. Pt. 2	53
Asilinæ	56
Asilus	57
Biorhiza	296
Brachylobus caurinus *Horn*	134
Bruchidæ	156
Buprestidæ	144
Caeporis nanula	29
Callimome citriformi *Ashm.*	xiii
dryorhizoxeni *Ashm.*	xiii
lividus *Ashm.*	xiii
melanoceræ *Ashm.*	xiii
Callirhytis	294
Calosoma Morrisonii *Horn*	128
Cantharis cardinalis	111
cinctipennis	107
croceicincta	107
cupreola	107
erythrothorax	108
molesta *Horn*	111
monilicornis	108
nigerrima	107
nigra	107
ocellata	107
punctuata	107
stigmata	107
variabilis	107
vicina	107

Digitized by Google

	PAGE
Canthon	163
chalcites	164, 166
corvinus	165
cyanellus	164, 166
depressipennis	164, 165
ebenus	164, 165
humeralis	165
indigaceus	164, 166
lævis	164, 166
LeContei	164, 165
militaris	165
nigricornis	164, 165
perplexus	164, 167
praticola	164, 165
probus	164, 165
puncticollis	164, 165
simplex	164, 165
vigilans	164, 166
viridis	164, 167
Carabidæ	128
Cerambycidæ, New	173
Ceroptres	297
Catesbæi *Ashm.*	301
citriformis *Ashm.*	300
lanigeræ *Ashm.*	301
minutissimi *Ashm.*	301
obtusilobæ *Ashm.*	300
pomiformis *Ashm.*	300
succinipedis *Ashm.*	300
virentis *Ashm.*	300
Chalcididæ, Studies on	x
Chalcidinæ	x
Chalcis flavipes *Ashm.*	xi
Chalcodermus spinifer	30
Chauliognathus ineptus *Horn*	150
misellus *Horn*	150
Chlænius insperatus *Horn*	134
Chœridium	170
Choleva alsiosa *Horn*	136
Choragus nitens *Lec.*	32
Chrysididæ	209, 245
Chrysidinæ	211, 225
Chrysis	225
aurichalcea	232
clara	239, 240
cobaltina *Aaron*	226, 228
cœrulans	233, 236
densa	229, 230
discreta *Aaron*	230

	PAGE
Chrysis Doriæ	231
dorsalis *Aaron*	233, 234
faceta *Aaron*	229
Frey-Gessneri	233, 234
hilaris	226, 227
hirsuta *Aaron*	233, 235
inæquidens	242
inflata *Aaron*	233, 237
integra	226
intricata	239, 241
inusitata *Aaron*	226, 227
lateri-dentata *Aaron*	226, 228
lauta	235, 238
martia	225, 226
Meta *Aaron*	232, 234
montana *Aaron*	233, 234
nitidula	233, 236
Nortoni *Aaron*	233, 237
optima *Aaron*	226, 227
pacifica	226, 227
parvula	231
Pattonii *Aaron*	233, 235
pelucidula *Aaron*	233, 235
pennsylvanica	239, 242
peracuta *Aaron*	233, 237
perpulchra	229
propria *Aaron*	233, 238
scitula	232
sexdentata	239, 241
smaragdula	239, 242
texana	239
tota	228
trispartita *Aaron*	233, 238
venusta	233, 236
verticalis	225, 226
Chrysobothris ignicollis *Horn*	145
Chrysochus auratus	156
cobaltinus	156
robustus *Horn*	156
Chrysomelidæ	156
Cleptinæ	210, 211
Cleptes	211
aliena	211
insperata *Aaron*	211, 212
Provancheri	211, 212
purpurata	211
speciosa *Aaron*	211, 212
Cleridæ	151
Clerus	154

Digitized by Google

	Page
Clerus arachnodes	154
decussatus	154
mexicanus	154
ocreatus *Horn*	154
quadriguttatus	154
thoracicus	154
viduus	154
Colaspis arizonæ	27
Coleoptera, Short Studies of,	1
Collapteryx	183
Colydiidæ	139
Colyphus cinctipennis	151
signaticollis	151
Comys albicoxa *Ashm.*	xvi
Conoecus *Horn*	159
ovipennis *Horn*	159
Copris procidua	171
Cordulegastrina	249, 286
Cordulegaster	287
annulatus	289
bidentatus	287
diastatops	290
dorsalis	289
obliquus	291
Coscinoptera bifaria *Lec.*	25
canella *Lec.*	25
dorsalis *Lec.*	25
vittigera	25
Coxelus serratus *Horn*	142
Cremastochilus	126
ineptus *Horn*	127
planipes *Horn*	126, 127
saucius	126
spinifer *Horn*	126
Crioprosopus lateralis *Lec.*	22
Crossidius discoideus	23
humeralis	176
Cryptobium, A study of	85
anceps *Horn*	88, 90
arizonense *Horn*	88, 96
badium	88, 89
bicolor	88, 92
californicum	99, 100
carolinum	88, 92
cribratum	99, 102
despectum	88, 90
floridanum	88, 89
Lecontei *Horn*	89, 94
lepidum	99, 102

	Page
Cryptobium lugubre	88, 91
nactum *Horn*	99, 102
obliquum	88, 91
pallipes	99, 100
pimerianum	88, 95
properum *Horn*	99, 101
prospiciens	98
pusillum	99, 101
sellatum	99, 103
serpentinum	99, 103
texanum	88, 93
tumidum	99
vagum *Horn*	88, 95
ventrale *Horn*	88, 97
vitatum *Horn*	88, 96
Cryptorhynchus brachialis *Lec.*	31
lutosus *Lec.*	31
Ctenuchidæ	80
Curculionidæ	161
Cychrus	2
regularis *Lec.*	2
Rickseckeri *Lec.*	2
Cyclogomphus?	271
Cymatodera fallax *Horn*	153
sirpata *Horn*	152
texana	152
turbata *Horn*	151
Cynipidous Galls	v
Cynipidæ, Catal. of N. Am	291, 293
Cynips	295, 296
q. capsuala *Ashm.*	ix
q. ficigera *Ashm.*	vi
q. fuliginosa *Ashm.*	vii
q. gemmaria *Ashm.*	ix
q. medullæ *Ashm.*	viii
q. minutissima *Ashm.*	vii
q. omnivora *Ashm.*	vi
Dasypogoninæ	53
Decatoma flavicollis *Ashm.*	xiii
Diastrophus	294
Diplorrhos *Aaron*	212, 216
plicatus *Aaron*	216
Dircæa Riversi *Lec.*	29
Ditoma quadricollis *Horn*	140
Dolopius	19
Dorcaschema	193
alternatum	194
nigrum	194
Wildii	194

Digitized by Google

	Page
Drapetes	198, 206, 208
geminatus	206
nitidus	206, 207
quadripustulatus	206, 207
rubricollis	206, 207
Drasterius	4
amabilis	5
asper *Lec*	4, 5
cribratus *Lec*	5
debilis *Lec*	5
elegans	4, 5
livens	4, 5
quadricollis	4, 5
simiolus	5
Dryophanta	296
Dryorhizoxenus	293
Dysphaga bicolor *Horn*	196
lævis	197
tenuipes	197
Dystaxia LeContei	146
Echinocoleus *Horn*	136
setiger *Horn*	136
Elachristinæ	xviii
Elampinæ	212
Elampus	212, 215
Cressoni *Aaron*	215
speculum	215, 216
variatus *Aaron*	215
Elateridæ, Study of	33
Elater	8, 13
affinis *Lec*	11, 13
apicatus	11
ater *Lec*	9, 12
atripennis	11
Behrensi	9
carbonicolor	9
collaris	11
cordatus	9
cordifer	9
dimidiatus	11
discoideus	10
fastus *Lec*	9, 11
hepaticus	9
Horni	9
impolitus	10
insignis *Lec*	9, 11
læsus	10
lateralis *Lec*	11, 12
linteus	10

	Page
Elater longicornis *Lec*	9, 12
luctuosus	11
manipularis	9
melinus *Lec*	9, 12
militaris	10
mixtus	10
mœrens	11
nevadensis *Lec*	11, 13
nigricans	11
nigricollis	10
nigrinus	10
obliquus	11, 13
partitus	9
pedalis	10
Phelpsii	9
pullus	10
pusio	11
rhodopus	9
rubricollis	10
rubricus	11
rubriventris *Lec*	9, 12
sanguinipennis	11
Sayi	10
semicinctus	10
socer	10
Sturmii	9
subtilis *Lec*	10, 12
torquatus *Lec*	11, 12
vitiosus	10
xanthomus	11
Encyrtinæ	xvi
Encyrtus albocinctus *Ashm*	xvi
lachni *Ashm*	xvi
schizoneuræ *Ashm*	xvi
Eniconyx *Horn*	51
gracilis *Horn*	52
pullatus *Horn*	52
Epicauta fallax *Horn*	111
insignis *Horn*	110
? Epigomphus	272
paludosus?	272
Erax	57, 64
æstuans	64, 65, 71
anomalus	64, 65, 69
Bastardii	64, 65, 71
costalis	64
dubius	64
furax *Will*	64, 65, 67
jubatus *Will*	64, 65, 66

Digitized by Google

PAGE

Erax lateralis....64, 65, 70
latrunculus *Will.*....64, 65, 67
leucocomus *Will.*....64, 65, 69
similis *Will.*....65, 68
stramineus *Will.*....64, 68
tagax *Will*....64, 65
varipes *Will*....64, 71
Erodiscus tinamus *Lec.*.... 30
Erotylidæ 139
Esthesopus....41, 44
bicolor....41, 44
claricollis 41
dispersus *Horn*....41, 43
parcus *Horn*....41, 42
præditus *Horn*....41, 42
pusio *Horn*....41, 43
Eucoila.... 298
Eucharinæ.... xi
Eudectus.... 4
crassicornis *Lec*.... 4
Eulophinæ....xviii
Eupelminæ.... xiv
Eupelmus conigeræ *Ashm*.... xv
hirtus *Ashm*.... xiv
mantis *Ashm*.... xv
Euphoria leucographa.... 172
subtomentosa.... 172
Euplectus marginatus *Ashm*....xviii
Eupogonius 196
pubescens.... 196
subarmatus.... 196
tomentosus 196
vestitus.... 196
Euryscopa Lecontei.... 25
vittata.... 25
Eurytoma obtusilobæ *Ashm*.... xii
Eurytominæ.... xii
Figites.... 298
Figitinæ 297
Galerita decipiens *Horn*.... 131
Galeruca erosa *Lec*.... 28
Galls on Cinereous Oak.... viii
Live Oak.... v
Willow Oak.... vii
Glaresis Frivaldskyi.... 118
inducta *Horn*....117, 118
mendica *Horn*....117, 118
Goes.... 193
debilis 193

PAGE

Goes oculata 193
pulverulenta 193
pulchra 193
tesselata.... 193
tigrina 193
Gomphina 250
Gomphoides....249, 273, 276, 277
Gomphus 249, 254, 260
adelphus 262
exilis *Hagen*.... 263
Graslinellus.... 264
notatus.... 270
olivaceus?.... 271
pallidus.... 266
plagiatus 269
spiniceps.... 270
vastus.... 265
vulgatissimus.... 261
Gracilia obliquata *Horn*.... 174
Graphops 26
beryllinus *Lec*.... 26
curtipennis.... 27, 28
marcassitus....27, 28
nebulosus....27, 28
obscurus *Lec*.... 26
pubescens....26, 27
simplex 27, 28
varians *Lec*.... 26
Hagenius....249, 278
brevistylus.... 279
japonicus.... 280
nanus.... 281
Halecia gentilis *Horn*.... 144
Heaychridium....213, 221
cæruleum....221, 222
dimidiatum.... 221
viride.... 221
Heaychrum....213, 222
continuum *Aaron*...222, 224
cupricolle....222, 223
obsoletum 222
violaceum 222, 223
Wiltii.... 223
Helops strigicollis *Horn*.... 161
Herpetogomphus....249, 255
compositus.... 256
designatus.... 255
Menetriesii.... 256
Histeridæ.... 142

Digitized by Google

	Page
Holopyga	213, 220
horus *Aaron*	220
ventralis	220
Hoplia trifasciata	171
Horistonotus	33, 40
basalis *Horn*	34, 36
curiatus	34, 38
definitus	34, 37
densus	34, 35
exoletus	34, 39
gracilis *Horn*	34, 39
inanus	34, 36
mitis *Horn*	35, 40
pullatus *Horn*	34, 35
simplex	34, 38
sufflatus	34, 37
transfugus	34, 37
Uhlerii	35, 40
vulneratus *Horn*	34, 35
Hydnobius arizonensis *Horn*	138
Hydnocera longa *Lec*	22
Hylobius	30
Hypexilis *Horn*	173
pallida *Horn*	173
Hypolampsis guttatus *Lec*	29
Ibalia	298
Ictinus	282
præcox	283
pugnax?	285
Inquilinæ	297
Ischiodontus	50
Kleidotoma	298
vagabunda *Ashm*	302
Lamprohiza Riversi *Lec*	20
Lampyridæ	148
Languria divisa *Horn*	139
Langurites lineatus	139
Laphria	54
anthrax	54
canis	54
felis	55
ferox	54
franciscana	54
gilva	54, 55
pubescens	55
ruficauda *Will*	55
saffrana	54, 56
sericeus	54
ventralis *Will*	54, 55
Laphria vivax	54
vultur	54
Xanthippe	55
Laphrinæ	54
Laphystia sexfasciata	53
Lasconotus borealis	141
complex	141
linearis	141
pusillus	141
referendarius	141
servus *Horn*	141
simplex	141
vegrandis *Horn*	140, 141
Lebia depicta *Horn*	133
furcata	133
lecta *Horn*	131
montana *Horn*	131
pectita *Horn*	133, 134
punctifera *Lec*	2
scapula *Horn*	132
vittata	133, 134
vivida	132
Lema balteata *Lec*	24
concolor *Lec*	24
Lembodes solitarius	31
Lepidoptera, Notes on	77
Leptoschema *Horn*	50
bicolor	51
discalceatum	51
protractum	51
Lindenia	249, 282
Liopus centralis *Lec*	24
Listrochelus flavipennis *Horn*	123
gracilis *Horn*	123
Loxaulis	296
Ludius	45, 49
abruptus	46, 48
ater	46, 47
attenuatus	46
hepaticus	46, 48
Lecontei	46
pinguis *Horn*	46, 47
texanus	46, 48
Luperus maculicollis *Lec*	27
Lycaina discoidalis *Horn*	150
marginata	149
Lycostomus loripes	149
sanguineus	149
Lycus Fernandezi	148

Digitized by Google

PAGE

Lygistopterus lætus..... 149
Lypsimena californica *Horn*..... 194
Macrobasis albida..... 109
atrivittata..... 110
Borrei.....107, 109
Gissleri..... 110
immaculata..... 110
lauta *Horn*.....108, 110
linearis.....109, 110
longicollis..... 110
ochrea..... 110
purpurea *Horn*.....108, 110
segmentata..... 110
tenella..... 110
tenuis..... 110
torsa..... 110
unicolor..... 110
virgulata..... 110
Mallophora..... 57
ardens..... 57
bomboides..... 57
clausicella.....57, 59
Guildiana *Will*.....57, 60
laphroides.....57, 59
nigra *Will*.....57, 58
orcina.....57, 58
Malthodes bicolor *Lec*..... 22
Megapenthes..... 6
angularis..... 7, 8
aterrimus..... 6, 7
elegans..... 6, 7
granulosus..... 6, 7
lepidus *Lec*..... 7
limbalis..... 6, 7
nigriventris *Lec*..... 6, 7
quadrimaculatus..... 7
Rogersii..... 7
rufilabris..... 6, 7
tartareus..... 6, 7
turbulentus..... 6, 7
Meloidæ, Studies among..... 107
Metaleptus angulatus..... 174
Batesi *Horn*..... 174
Microphotus angustus..... 20
Monilema.....180, 182, 190
annulatum.....182, 184
appressum.....182, 184
armatum.....183, 186
crassum.....184, 189

PAGE

Monilema forte.....183, 187
gigas.....183, 185
lævigatum.....183, 185
obtusum.....183, 186
semipunctatum.....183, 185
spoliatum *Horn*.....183, 186
subrugosum.....183, 187
Ulkei *Horn*.....184, 188
variolare.....184, 188
Monohammus.....190, 192
confusor.....191, 192
maculosus.....190, 191
marmorator.....191, 192
scutellatus..... 191
titillator.....190, 191
Myelaphus lobicornis..... 53
Neuroterus..... 296
Notozus.....212, 217
hyalinus *Aaron*.....217, 218
intermedius *Aaron*.....217, 218
marginatus.....217, 219
nitidus *Aaron*.....217, 218
productus *Aaron*..... 217, 219
seminudus *Aaron*.....217, 218
versicolor.....217, 218
viridicyaneus.....217, 219
Odonata, Earlier stages of..... 249
Omalus.....212, 213
corruscans.....213, 214
diversus *Aaron*..... 213
iridescens..... 213
læviventris.....213, 214
semicircularis *Aaron*...213, 215
sinuosus.....213, 214
Ommatius..... 57
tibialis..... 76
Oncideres..... 194
cingulata..... 195
pustulata.....194, 195
putator.....194, 195
texana *Horn*.....194, 195
Onychia..... 298
Onychogomphus..... 253
lineatus..... 253
Ophiogomphus.....249, 257
carolinus *Hagen*..... 258
columbrinus..... 257
occidentis *Hagen*..... 259
severus..... 259

Digitized by Google

	PAGE
Orchestes betulcti *Horn*	161
Orizabus ligyroides *Horn*	125
Snowii *Horn*	124
Ormyrus dryorhizoxeni *Ashm*	xiv
labotus	xiv
rosæ *Ashm*	xiv
Oxoplus corallinus	175
cruentus	175
jocosus *Horn*	175
marginatus	23, 175
Oxyporus austrinus *Horn*	135
fasciatus	135
occipitalis	135
Pacheteles parca *Lec*	2
Pachylobius picivorus	29
Pactopus	205
Hornii	206, 208
Parnopinæ	211, 244
Parnopes	244
chrysoprasina	245
Edwardsii	244
Periclistis	297
Phanæus	163, 167
carnifex	168, 169
difformis	168
igneus	168, 169
mexicanus	168, 169
Pluto	168
quadridens	168
triangularis	168, 169
Phyllecthrus texanus *Lec*	28
Phyllobrotica livida *Lec*	28
Phymatodes ater *Lec*	22
Phytalus	119
cephalicus *Horn*	120
debilis *Horn*	120, 122
georgianus *Horn*	120, 122
lævigatus	120
pallidus *Horn*	120, 121
pubicollis	120
robustus *Horn*	119, 120
vexatus *Horn*	120, 121
Plagithmysus	197
Platycerus Agassii	169
Platynus? quadrimaculatus *Horn*	130
Plectrodes palpalis	119
Pleotomus nigripennis *Lec*	20
Plusiotis Woodii *Horn*	124
Pogonosoma melanoptera	56
Polemius marginicollis *Lec*	21
princeps *Lec*	21
strenuus *Lec*	21
Proctacanthus	57, 73
Progomphus	249, 274, 275
obscurus	274
Promacus	57, 60
albifacies *Will*	60, 63
Bastardi	60, 63
Fitchii	60, 61
princeps *Will*	60, 62
rufipes	60, 61
vertebratus	60, 62
Protocanthus brevipennis	73
heros	73, 74
Milbertii	73, 74
philadelphicus	73, 74
rufus *Will*	73, 74
Psenidæ	293
Pseudomus inflatus *Lec*	31
Pteromalinæ	xvii
Pteroplatus apicalis *Lec*	24
divisus *Lec*	23
ignitus *Lec*	24
rufipennis *Lec*	23
Ptomaphagus fusus *Horn*	137
Ulkei *Horn*	137
Purpuricenus dimidiatus *Lec*	23
Pyromorphidæ	80
Pyropyga simplex *Lec*	20
Pyrota	112
bilineata *Horn*	115
discoidea	114
dubitabilis *Horn*	113
Engelmanni	113
Germari	114
insulata	114
invita *Horn*	114
limbalis	115
lineata	115
mylabrina	112
postica	113
sinuata	115
terminata	113
Rhinandrus sublævis *Horn*	160
Rhodites	293
Sapholytus gemmariæ *Ashm*	302
Saxinis apicalis *Lec*	25
Scarabæidæ, Descr. of N. Am.	117

Digitized by Google

	Page
Schizopus Sallei *Horn*	145
Scydmænidæ	138
Scydmænus deformatus *Horn*	138
Semiotellus ficigeræ *Ashm*	xvii
Silis atra *Lec*	22
Silphidæ	136
Sinoxylon floridanum *Horn*	155
simplex *Horn*	155
Smicra	x
hirtifemora *Ashm*	x
longipetiola *Ashm*	x
vittata *Ashm*	x
Spathizus *Lec*	20
bicolor *Lec*	21
Stenosphenus	177
debilis *Horn*	178, 179
dolosus *Horn*	178, 179
lepidus *Horn*	178, 179
lugens	178
notatus	178
novatus *Horn*	178
Staphylinidæ	135
Stichopogon trifasciatus	53
Stilbum	243
amethystinum	243
Stolonis	129
Ulkei *Horn*	129
Synchita dentata *Horn*	139
obscura *Horn*	140
Synergus	297
batatoides *Ashm*	301
bicolor *Ashm*	302
coniferæ *Ashm*	301
ficigeræ *Ashm*	301
medullæ *Ashm*	302
Syntomoidæ	80
Tachygonus tardipes	32
Telephorus costipennis *Lec*	21
Tenebrionidæ	159
Tetranemus floridanus *Ashm*	xviii
Tetraonyx	116
femoralis	116
frontalis	116
fulva	116
quadrimaculata	116
Tetrastichinæ	xix
Tetrastichus lecanii *Ashm*	xix
Thecla striatopunctata *Lec*	22
Thoracantha floridana *Ashm*	xi
Thrincopyge alacris	147
ambiens	147
lætifica *Horn*	146, 147
Throscidæ	198
Throscus	198, 208
alienus	199, 202
Chevrolati	200, 203
constrictor	199, 201
convergens *Horn*	200, 202
debilis *Horn*	200, 205
invisus *Horn*	199, 201
mendax *Horn*	200, 203
parvulus	200, 204
pugnax *Horn*	200, 202
punctatus	199, 200
sejunctus *Horn*	200, 204
sericeus	200, 204
validus	199, 200
Tillus occidentalis	151
Toryminæ	xiii
Toxotropis fasciatus *Lec*	32
pusilla	32
Tribalia	294
Trichotheca vagans *Lec*	26
Tylosis	176
Tyndaris cincta *Horn*	147
Ulkeus *Horn*	142
intricatus *Horn*	143
Uropetala Thoreyi ?	281
Xenochestes americanus	32
Zabrotes *Horn*	156
cruciger *Horn*	157
densus *Horn*	157, 158
obliteratus *Horn*	157, 158
planifrons *Horn*	157, 158
spectabilis *Horn*	157
subnitens *Horn*	158
Zarhipis integripennis	148
piciventris	148
Riversi *Horn*	148
ruficollis	148
Zopherus granicollis *Horn*	160
Zygænidæ	80
Zygops seminivens *Lec*	31

Digitized by Google

ERRATA.

Page 251, line 14 from top, for West Indies, read United States.
" 251, last line, for specimens, read species.
" 252, line 3 from top, for specimens, read species.
" 252, line 12 from top, for specimens, read species.
" 252, line 13 from top, for specimens, read species.
" 252, line 16 from top, for specimens, read species.
" 254, line 13 from top, for vertum, read rectum.
" 256, line 17 from bottom, for horns, read hooks.
" 261, line 9 from bottom, for second segment, read third segment.
" 271, line 21 from top, for pockets, read bags.
" 273, line 6 from bottom, for distinct, read distant.
" 297, line 8 from bottom, for **sapholitus**, read **SAPHOLYTUS**.

Digitized by Google

TRANSACTIONS

OF THE

AMERICAN ENTOMOLOGICAL SOCIETY.

VOLUME XII.

Short Studies of North American COLEOPTERA. (No. 2)

BY JOHN L. LECONTE, M. D.*

I have here included descriptions of nearly all the the important or interesting species which remained undescribed in my collection, except those which require special memoirs or monographs for their proper elucidation. Other species belonging to families to which he has given special attention are comprised in a foregoing paper by Dr. Horn, so that these two papers may be considered to exhaust the miscellaneous material now in our possession.

I am indebted to the kindness and facile pencil of Dr. Horn for his excellent illustration of *Amphichroum maculatum*.

* After the completion of the second edition of the Classification, Dr. LeConte employed his moments of better health in arranging some portions of his cabinet and writing descriptions of such new species as seemed worthy of separate publication. He was in his study when the chill came on which rendered him comatose and ended in death. After his burial I visited his study and found evidences of very recent work, the manuscript, the open inkstand, the pen and the specimens were as if he had just left them. The manuscript was fragmentary, and much of it incomplete, requiring on my part a thorough study of the material for the completion of the tables and the description of the new species. I can only regret that the publication has from necessity met with delay, which is partially compensated by the recognition of a certain amount of synonymy which has been avoided. The two years just passed will always be recalled with profound sorrow, it having been my privilege with my friend Sallé to prepare for publication a posthumous memoir by Baron Chaudoir in 1882, and now alone to present the evidences of the unflagging zeal of my lamented friend and associate, Dr. John L. LeConte.—(Geo. H. Horn)

Digitized by Google

CYCHRUS Fab.

Mr. L. E. Ricksecker, who has diligently collected in the vicinity of Spokane Falls, Washington Territory, has kindly communicated to me two forms of this interesting genus, which seem to be entitled to specific recognition. Mr. Ricksecker has been singularly fortunate in his Cychrine discoveries, and it is to him that we owe our knowledge of the occurrence of the group (Sphæroderus), with front tarsi of ♂ strongly dilated, west of the Rocky Mountains, in *C. relictus* Horn.

C. (Sphæroderus) **regularis.**—Black, not very shining, of the same form and sculpture as C. relictus, except on the elytra, which have 12 perfectly regular and entire impressed punctured striæ; the 13th is composed of separate punctures confused with the marginal ones; the interspaces are somewhat wider than the striæ, the 4th and 8th are interrupted by only 3 or 4 punctures. Length 16 mm.; .65 inch.

♂. Front tarsi with joints 1–3 dilated, as broad as their respective lengths, densely papillose beneath.

One pair found in the Cœur d' Aléne Mountains, Idaho, by Mr. Ricksecker, and kindly communicated to me.

C. Rickseckeri.—Black, head and prothorax densely strongly punctured, the latter slightly wider than long, narrowed behind but scarcely sinuate on the sides; hind angles obtuse, dorsal channel and posterior transverse impression well marked; basal impressions wanting. Elytra nearly perpendicularly declivous behind, closely rugose and densely covered with shining granules, which exhibit in places a slight tendency to form regular rows. Length 17.5 mm.; .7 inch.

Montana, one specimen, Mr. Ricksecker. This species is intermediate between *C. tuberculatus* and *C. Hemphillii.*

PACHETELES Chaud.

P. parca.—Slender, elongate, piceous, under surface and legs rufo-piceous. Head and prothorax finely rugose, with scattered distinct punctures. Prothorax as long as wide, dorsal line entire, sides strongly margined and reflexed, broadly rounded, sub-sinuate near the base, apex slightly emarginate, front angles somewhat acute, hind angles rectangular, base nearly straight. Elytra obtusely striate, interspaces moderately convex, alutaceous, each with a row of well marked distant punctures. Antennæ stout, extending to the base of the prothorax; front thighs armed with a large acute tooth. Length 14 mm.

Arizona, one specimen. Resembles the description given by Chaudoir of some of the large Tropical species, but seems to differ from all of them by the punctures of the head and thorax, and by the interspaces of the elytra each being furnished with punctures.

LEBIA Latr.

L. punctifera.—Pale piceous, glabrous, punctured above except on the front and middle of the head; under surface smooth. Prothorax with the basal lobe feeble, sides broadly flattened and rounded, hind angles nearly rectangular. Ely-

Digitized by Google

tra a little wider than the thorax, striæ sharply impressed, not punctured, interspaces flat, sparsely punctured, 3d stria with two dorsal punctures. Length 8 mm.

Arizona, one specimen. Very similar in appearance to Plochionus pallens, but quite distinct by the punctured upper surface. Seems to belong to Chaudoir's genus Lionedya.

AMPHICHROUM Kraatz.

A. maculatum n. sp.—Beneath piceous, above testaceous. Head piceous, coarsely punctate. Antennæ piceous, three basal joints testaceous. Thorax oval, slightly transverse, apex and base nearly equal, sides arcuate, margin slightly reflexed, surface rather coarsely punctate, sparsely pubescent. Elytra testaceous, an oval, oblique piceous spot on each, coarsely punctured, sparsely pubescent. Abdomen piceous, more closely and much more finely punctured than the elytra. Length 6 mm.

Male.—Anterior femora stout, strongly angulate beneath and with a small tooth, the tibiæ arcuate and thickened at tip; anterior tarsi dilated the first joint more broadly and longer than the next three joints together. Middle femora more slender, the tibiæ arcuate, broader toward the tip and with an emargination on the inner side near the tip which is bordered with short fimbriæ. Posterior femora more slender, the tibiæ straight with a slight emargination on the inner side near the tip. Prosternum on each side with a group of coarse punctures bearing short erect spines.

Female.—The femora are more slender than in the male and the anterior is not angulate. The tibiæ are straight and slender, not emarginate nor thickened. The anterior tarsi are slightly dilated, the first joint not as long as the next three together. Prosternum not spinous.

Occurs in the high Sierras of California, Big Trees, Calaveras Co. (Carl Fehr.) and western Nevada (Morrison).

Since the publication of the figure* of the male of this species (Tr. Am. Ent. Soc. x, pl. ix) Dr. Horn has recognized the female in his cabinet. The sexual characters mark this insect as one of the most peculiar of the genus in our fauna.

* As stated above (loc. cit. p. 285) the figure of the above species was prepared by me at Dr. LeConte's request and appears as *Stachygraphis maculata*. On the arrival of my figure Mr. Fauvel recognized the species as the one erroneously referred to *Amphichroum canaliculatum* Er. (Notices Entomologiques, pt. 7, p. 76), concerning which Mr. Fauvel writes as follows: "*Stachygraphis maculata* is the insect described by error in my Staphylinidæ of N. A. as *Amphichroum canaliculatum*. At the time of my description I had merely an individual in fragments, but since I have others of both sexes from Nevada. It is a new species extremely near *hirtellum* but larger with the more robust head more strongly punctured, more unequal; the thorax larger and longer, a little narrower in front; the female has but a few finer hairs behind the eyes. In *hirtellum* the anterior tibiæ are sinuate to the middle, then swollen in mass toward the summit, squarely truncate at tip. Apart from these differences *maculatum* resembles *hirtellum* and might be considered a race from the Alps of California."—(Geo. H. Horn.)

Digitized by Google

EUDECTUS Redt.

This genus, characterized in the table on p. 104 of the second Ed. of Class. Col. N. Am., is allied to Coryphium but differs by the antennæ, which are not longer than the head and prothorax and much stouter; the outer joints are distinctly transverse. The joints 1–4 of the hind tarsi are short and nearly equal, combined as long as the 5th. The elytra are long, parallel and densely punctured with narrow side-margin. Prothorax wider than long; sides narrowly margined, angulated about the middle disc densely coarsely punctured, with a deep dorsal line ending behind the middle and surrounded behind by a curved impression.

E. crassicornis.—Piceous, opaque, nearly glabrous; base of antennæ and elytra paler; legs testaceous. Length 1.5 mm.

One specimen, Opelousas, La.; Mr. Salle. The dorsal segments are nearly smooth. The head has two small frontal impressions and widely separated occipital ocelli. The penultimate joint of the maxillary palpi is thick, obconical, and the last joint small, acicular.

DRASTERIUS Esch.

This genus is very similar to Elater, but differs by the dilated part of the hind coxæ being truncate in front of the trochanter, and not emarginate as in Elater and Megapenthes; the angle is therefore obtuse, not prominent as in those genera. The antennæ are but feebly serrate, the 2d and 3d joints nearly equal, united longer than the 4th. The pubescence is coarse and the punctures deep, except in D. debilis. The color is often brown-yellow, with black spots.

Prothorax deeply punctured ..... 2.
Prothorax finely punctulate ..... 8.
2.—Prothorax not wider than elytra ..... 3.
Prothorax wider than elytra, and two-thirds as long; opaque dirty piceous elytral striæ cribrate; 6 mm. California ..... **grandicollis.**
3.—Prothorax distinctly narrowed near the front ..... 4.
Slender, cylindrical, prothorax not narrowed in front, very densely more finely punctured; opaque, dull ferruginous, with a dorsal thoracic piceous cloud and an elytral fascia behind the middle; interspaces very rough; 7 mm. S. Texas ..... 2. **asper.**
4.—Prothorax in great part yellow ..... 5.
Prothorax black ..... 7.
5.—Prothorax more densely punctured, less shining, with a dorsal vitta sometimes absent; elytra with an elongate black spot near the base, and a transverse band behind the middle; 5–7.5 mm. California ..... 3. **livens.**
Prothorax less densely punctured, more shining. Head thoracic dorsal stripe, scutel, elongate elytral spot and posterior sinuate band blackish. Varies with only the band of elytra dark, also with the black suffused; 6–7 mm. Lake Superior, Penna., Kansas, Texas, Cal. ..... 4. **elegans.**

Digitized by Google

Much smaller, color and sculpture as in D. elegans; hind angles of prothorax more divergent; 3 mm. Maryland, Texas.....5. **amabilis.**

Stouter, punctures of elytral striæ much coarser; color and sculpture as in D. elegans; 3–5 mm. Texas.....6. **cribratus.**

7.—Entirely black, pubescence coarse, gray 5 mm. California.....7. **simiolus.**

8.—Linear, very slender, black finely punctulate and pubescent; antennæ, legs, base and apex of elytra, and base of prothorax brown; 4.5 mm. Lake Superior.....8. **debilis.**

Bibliography.

1. **D. grandicollis** Horn, Trans. Am. Ent. Soc. 1871, 308, pl. iv, fig. 8.

2. **D. asper** n. sp.—More slender than usual, having the form of a small Dolopius oblongicollis, dull ferruginous, head and posterior transverse band of elytra black, also a small cloud in front of the middle of each. Antennæ longer than prothorax, slightly serrate, 2d and 3d joints united as long as the 4th. Prothorax densely and finely punctured, nearly twice as long as wide, scarcely narrowed in front, divergent, disc with a dorsal blackish oval spot; elytral striæ deep, interspaces strongly rugosely punctured; 7 mm.

Texas. One specimen collected by Belfrage.

3. **D. livens** Lec. Trans. Am. Phil. Soc. X, 484 (Monocrepidius); Cand. Mon. El. II, 430.

4. **D. elegans** Fabr. Ent. Syst. I, II, 230; Syst. El. II, 240; Herbst, Käfer, X, 132; *dorsalis* Say, Jour. Ac. Nat. Sc. Phil. III, 167; ed. Lec. II, 108; Lap. Hist. Nat. Col. I, 246; Germ. Zeitschr. V, 147 (Cryptohypnus); Lec. Trans. Am. Phil. Soc. X, 485 (Monocrepidius); Cand. Mon. El. II, 285 (Aeolus); marks normal, well limited; *comis* Lec. loc. cit. X, 484 (Monocrepidius); Cand. Mon. El. II, 429; *variegatus* Boh. Eug. Resa, p. 69; dark spots larger, confluent; *circumscriptus* Germ. Ins. Nov. 46; Zeitschr. VI, 46 (Cryptohypnus); suffused with black; *marginicollis* Horn, Trans. Am. Ent. Soc. 1871, 308.

5. **D. amabilis** Lec. loc. cit. X, 485.

6. **D. cribratus** n. sp.—Dull brown, antennæ and legs paler; deeply more strongly punctured than in the others, pubescence yellow. Antennæ longer than prothorax, slender, 2d and 3d joints united equal to the 4th. Head black. Prothorax longer than wide, nearly cylindrical, slightly narrower near the front, hind angles long slightly divergent, sharply carinate, disc with an elongate blackish spot. Elytra with a long anterior black spot and a transverse band behind the middle; striæ very coarsely punctured, interspaces finely punctulate; 3.5 mm.

Texas. One specimen collected by Belfrage.

7. **D. simiolus** Cand. Mon. El. II, 428. I have received a specimen from Dr. Candéze, as collected in California? but have no other knowledge of its occurring north of Mexico.

8. **D. debilis** n. sp.—Black, very finely punctured, finely gray pubescent. Antennæ, legs and elytra brown, the last two with a broad band at the middle and the suture darker. Prothorax one-half longer than wide nearly cylindrical hind angles long slightly divergent, testaceous, sharply carinate. Elytral striæ deep, interspaces densely punctured; 4–5 mm.

Digitized by Google

Marquette, Lake Superior; Messrs. Hubbard & Schwarz. The antennæ are slender, as long as the prothorax, with the 2d and 3d joints united as long as the 4th. Differs in no respect from Drasterius, though the punctuation is much finer than in the other species.

MEGAPENTHES Kiesenw.

This genus only differs from Elater by the sutures of the prosternum being not excavated in front between the sternum and the flanks; the 2d and 3d antennal joints are frequently small, equal and together not longer than the 4th, but in this respect there is not an entire uniformity.

In all the species the prosternum is concave or channeled between the front coxæ, which is not the case in Elater.

A.—Hind angles of prothorax unicarinate.

Opaque, very densely punctured. Antennæ strongly serrate, joints 2–3 very small shorter than 4th; in the male with stiff erect hairs.....2

Less densely punctured not opaque. Antennæ moderately serrate.....5.

2.—Pubescence black.....3.

Pubescence brown.....4.

3.—Beneath less finely and densely punctured; prosternum channeled between the coxæ; color dull black, legs sometimes dark red; 9.5–11 mm. Oregon, Southern California.....1. **tartareus.**

Beneath finely more densely punctured, prosternum concave between the coxæ; black, elytra dirty yellow with darker clouds; 14 mm. San Diego, Cal.....2. **turbulentus.**

Entirely black, abdomen very finely, still more densely punctured; prosternum concave between the coxæ; 9–16 mm. New Mexico, Northern California.....3. **aterrimus.**

4.—Entirely black, very finely and densely punctured beneath; prosternum concave between the coxæ; 13–16 mm. Penna.....4. **granulosus.**

Black, beneath very finely, densely punctured: prosternum depressed between the coxæ; the whole of the limb of elytra and disc of prothorax reddish yellow, the latter with a medial spot, basal and part of side-margin black; 8–11 mm. Middle and Southern States.....5. **limbalis.**

5.—Antennæ with the 2d and 3d joints small equal.....6.

Antennæ with 3d joint longer than 2d.....9.

6.—Prothorax yellowish at base.....7.

Prothorax entirely black.....8.

Prothorax and legs red, antennæ of male with erect hair; body long, slender, prosternum black; 8 mm. California, Wash. Terr.....6. **nigriventris.**

7.—Piceous, base of prothorax and elytra, and legs testaceous; 7 mm. Middle and Southern States.....7. **rufilabris.**

Black, two basal prothoracic spots at the hind angles yellow; elytra with the anterior half and a transverse band behind the middle, and a small spot at the anterior fourth black; 8 mm. California.....8. **elegans.**

Digitized by Google

8.—Black, elytra with an elongate pale yellow spot from the middle of the base of each hooked to the side margin at the middle, and a transverse spot at the hindmost fourth from the side nearly to the suture; 5–6 mm. Northern Canada; Vancouver. .....9. **stigmosus.**

Varies with the spots very small.

Black, elytra with a large basal spot often extending beyond the middle, and a posterior one orange; 5.5 mm. California....10. **quadrimaculatus.**

Black, elytra orange, scutellar spot and two transverse bands connected along the suture black; 8 mm. Californi.a.....11. **Rogersii.**

9.—Very black, pubescence black; prothorax sparsely, finely punctured, disc and flanks bright red; antennæ strongly serrate, 3d joint as large as 4th. 12. **lepidus.**

B.—Hind angles of prothorax bicarinate.

Elongate, sub-cuneiform, pubescence brown; prothorax longer than wide deeply punctured, narrowed near the front, hind angles acutely bicarinate; elytral striæ fine, interspaces slightly convex, finely punctured; antennæ as long as the prothorax, slender, 2d and 3d joints united as long as the 4th; 10 mm. Missouri.....13. **angularis.**

Bibliography.

1. **M. tartareus** Lec. Proc. Ac. Nat. Sc. Phila. 1859, 85; this species and *aterrimus* bear a remarkable resemblance to *Elater Sturmii*, but the last has the prosternal sutures distinctly excavated in front.

2. **M. turbulentus** Lec. Trans. Am. Phil. Soc. X, 463; Cand. Mon. El. II, 508

3. **M. aterrimus** Horn, Trans. Am. Ent. Soc. 1871, 309.

4. **M. granulosus** Mels. Proc. Ac. Nat. Sc. Phila. II, 159 (Ectinus); Cand. Mon. El. II, 497; *Sturmii* Lec. loc. cit. X, 463.

5. **M. limbalis** Herbst, Käfer, X, 53, pl. 162, fig. 10; Say, Trans. Am. Phil. Soc. VI, 167; ed. Lec. II, 601; Germ. Zeitschr. V, 164; Lec. loc. cit. X, 463; Cand. Mon. El. IV, 312 (Ludius).

6. **M. nigriventris** n. sp.—Slender, sub-cuneiform, black with fine, short yellow pubescence, legs and prothorax bright red, the latter longer than wide, broadly on the sides, hind angles not divergent nor strongly carinate; prosternum black. Elytra deeply rugosely punctured. Antennæ long slender, black, in the male with stiff erect hair, 2d and 3d joints small united shorter than the 4th; 8 mm.

California and Washington Territory.

7. **M. rufilabris** Germ. Ins. Nov. 47; Zeitschr. V, 169; Lec. loc. cit. X, 472; Cand. Mon. El. II, 498.

8. **M. elegans** Horn, Trans. Am. Ent. Soc. 1871, 310, pl. IV, fig. 12.

9. **M. stigmosus** Lec. loc. cit. X, 472; Cand. Mon. El. II, 509; *caprella* Lec. Pacific Expl. and Surv. XI, 47; Cand. Mon. El. II, 510.

10. **M. quadrimaculatus** Horn, Trans. Am. Ent. Soc. 1871, p. 313.

11. **M. Rogersii** Horn, Trans. Am. Ent. Soc. 1871, 310, pl. IV, fig. 9.

12. **M. lepidus** n. sp.—Very black, with a bluish tinge, pubescence black, form sub-cuneiform, less elongate than in the other species; prothorax finely sparsely punctured, disc and flanks bright red, narrowed from the base, longer than wide

Digitized by Google

sides more rounded in the female than in the male, prosternum black very sparsely punctured. Antennæ as long as prothorax in female, longer in male, strongly serrate, 3d joint triangular, equal to 4th in male, somewhat smaller in female; 7 mm.

San Joaquim Co., Cal.; Mr. Blüthner.

13. **M. angularis** Lec. Proc. Ac. Nat. Sc. 1866, 390. Differs from the other species by the hind coxal plates not emarginate in front of the trochanters, but simply truncate, as in Drasterius.

ELATER Linn.

This genus indicates a central set of species, of tolerably uniform organization, and may be distinguished as follows: Body more or less cuneiform, pubescent; front convex, distinctly margined, base of labrum on a lower level; antennæ serrate 3d joint frequently but little wider than 2d, though often as long as the 4th; prothorax narrowed in front, hind angles long, acutely carinate, basal fissures very short, side margin fine, distinct; prosternal sutures double, excavated near the anterior lobe, which is rounded and moderately long. Scutel rounded. Elytra strongly striate. Hind coxal plates narrow at the outer part, then rather suddenly dilated, distinctly emarginate from the dilated part to the median line; tarsi as long as the tibiæ, joints 1–4 gradually shorter, 5th again longer, claws slender, not toothed.

From Megapenthes this genus is distinguished by the prosternal sutures excavated in front, from Ludius by the front being distinctly elevated above the labrum, and by the hind coxal plates much narrower at the outer part.

E. gracilis makes an exception to the other species by the more linear elongate form and the longer more slender antennæ and legs.

Observing that in other genera of Elateridæ frequent variations in color occurred, I have availed myself of the circumstance to suppress those species which could not be defined by well marked differences in sculpture. According to the hind angles of the prothorax, they may be divided as follows:

A.—Hind angles of prothorax bicarinate.

Brown or piceous, pubescence coarse, brown; prothorax thickly, somewhat coarsely punctured; elytra with interspaces distinctly punctured.....2.
Black, pubescence finer black.....3.
Prothorax red, elytra black.....4.
Yellow-brown, pubescence yellow, fine.....5.

Digitized by Google

2.—Antennæ and legs reddish brown, prothorax equally punctured, antennæ slender, second joint not very small, third shorter than fourth; 9 mm. Middle and Western States and Canada..... .....1. **hepaticus.**

Antennæ and legs dull red, prothorax coarsely punctured, antennæ with broad joints, the second very small, third as long as fourth; 14 mm. Texas. 2. **insignis.**

3.—Prothorax finely densely punctured; antennæ, legs and under side of body reddish brown or ferruginous; 12.5 mm. Oregon, California and Vancouver. 3. **rhodopus.**

4.—Black, prothorax above and beneath bright red; antennæ with third joint as long as fourth, triangular in male, narrow in female; 6.5–8 mm. Southern California.....4. **fastus.**

Red, head, elytra and propectus black; antennæ brown, strongly serrate, third joint (male) equal to fourth; prothorax more densely punctured; 8 mm. New Mexico.....5. **rubriventris.**

5.—Prothorax and flanks, legs and elytra dull yellow; elytra with an apical black space; antennæ black brown, third joint but little longer than second; 7.5 mm. Nevada.....6. **partitus.**

Dull yellow, head, scutel, postpectus and antennæ black, the last with third joint but little longer than second; 7 mm. California.....7. **melinus.**

B.—Hind angles of thorax unicarinate.

Prothorax clothed with stiff erect hair.....2.

Pubescence much inclined.....5.

2.—Prothorax shining.....3.

Prothorax opaque, densely punctured.

Entirely black; 11 mm. Florida .....8. **Sturmii.**

Elytra red, apical third black; 7-8.5 mm. California.....9. **Phelpsii.**

3.—Elytra half red, half black; 6 mm. California..... 10. **Horni.**

Elytra red with apical space black.

Pubescence yellow; 8 mm. California.....11. **cordatus.**

Pubescence black.

Elytra scarlet with apical third black, the black space attaining the side margin and apex; 8.5 mm. California, Vancouver.....12. **Behrensi.**

Elytra scarlet with apical cordiform black spot which attains the apex but not side margin; 8-10 mm. California.....13. **cordifer.**

Entire surface black; 8.5 mm. Colorado.....14. **ater.**

5.—Antennæ feebly serrate, joints longer than wide, outer angles not acute.....6.

Antennæ strongly serrate, joints not longer than wide, outer angles acute....10.

6.—Dark brown, pubescence coarse; prothorax equably deeply punctured.....7.

Black, finely pubescent; prothorax more finely and sparsely punctured behind.8.

Elytra more or less brownish red, or spotted..... 9.

7.—Cuneiform, more strongly punctured; antennæ as long as the prothorax; hind angles of latter divergent; 8–11.5 mm. Canada to Texas. 15. **manipularis.**

Linear, very elongate; prothorax with hind angles diverging; antennæ much longer than prothorax; 9 mm. California..... 16. **longicornis.**

8.—Third joint of antennæ nearly as long as the fourth; antennæ and legs nearly black; thorax very sparsely punctate; 7.25 mm. Alaska. 17. **carbonicolor.**

Digitized by Google

Third joint of antennæ shorter than the fourth.

Pubescence brownish, antennæ brown; 6–8 mm. Middle and N. E. States Canada to British Columbia..... 18. **pedalis.**

Pubescence black, antennæ piceous; 8–9.5 mm. Alaska to Vancouver. 19. **nigrinus.**

9.—Prothorax more deeply punctured, pubescence longer; 5–8 mm. Anticosti, N. H., Lake Superior. Varies with elytra of lighter tint.....20. **mixtus.**

Prothorax more finely punctured, pubescence shorter; elytra red, black from the middle to the tip; 5–5.5 mm. Maine to Wash. Territory..21. **pullus.**

10.—Antennæ with 3d joint triangular in both sexes.....11.

Antennæ with 3d joint at most feebly triangular in male .....13.

11.—Legs black.....12.

Legs pale; elytra pale yellow, margins blackish near the tip; 3d antennal joint of male smaller than 4th; 8.5–10 mm. Canada, Georgia. 22. **nigricollis.**

12.—Elytra pale yellow, sutural margin and tip black; 3d antennal joint of male as large as 4th; 7.5–8.5 mm. Canada, Georgia, Illinois.....23. **linteus.**

Elytra black, basal and lateral margins scarlet; 3d antennal joint of male smaller than 4th; 10 mm. Canada, Georgia.....24. **discoideus.**

Elytra yellow, cloudy on the margins at the tip; 3d antennal joint of male smaller than 4th; 10–14 mm. Canada, Middle and Western States. 25. **vitiosus.**

Dull black, base of elytra and sides for one-fourth the length red; 12 mm. Massachusetts.....26. **luesus.**

Elytra yellow, sutural band stripe and lateral margin black; 9–12 mm. New York .....27. **Sayi.**

Antennæ with third joint very little longer than second and very obviously shorter than the fourth 14

Antennæ with third joint very nearly equal to the fourth and much longer than second.

Pubescence of thorax rather long and coarse; legs reddish brown; 12 mm. Middle States.....28. **impolitus.**

Pubescence of thorax very short.

Body uniformly dark brown, nearly black; 11–13 mm. Pennsylvania, Illinois, Hudson's Bay. .....29. **socer.**

Thorax red; 11–14 mm. Georgia, Mass., Ill.....30. **rubricollis.**

14.—Black, legs ferruginous.....15.

Black, prothorax more or less red.....19.

Black, elytra more or less brown-red or scarlet.....20.

Black, prothorax deeply punctured; elytra red at base and at sides in front; 9.5–11 mm. Canada, New England.....31. **semicinctus.**

Black, legs piceous; elytra dirty pale yellow, suture and margin narrowly black; 8 mm. New York.....32. **militaris.**

General color yellow-brown, small species.....21.

15.—Prothorax finely and sparsely punctate; antennæ ferruginous joints 2–3 smaller than usual, together scarcely longer than the fourth: 7 mm. Lake Superior.....33. **subtilis.**

Prothorax deeply rather densely punctured.....16.

16.—Pubescence black.....17.

Pubescence brown or brown-yellow.....18.

Digitized by Google

17.—Antennæ ferruginous; legs piceous or brown, tarsi conspicuously paler; 7–12 mm. California, Oregon, H. B. T.....34. **mœrens.**

18.—Pubescence brown, surface less shining, legs piceous; thorax more sharply and coarsely punctate; 8–13 mm. Northern, Anticosti to Lake Superior. 35. **luctuosus.**

Pubescence brown-yellow or fulvous, surface shining, legs ferruginous, thorax more sparsely, less deeply punctate; 7–9 mm. Pennsylvania to Canada, Lake Superior and H. B. T.....36. **nigricans.**

19.—Prothorax at base and sides dull red; 7–9 mm. Va. to Can..37. **rubricus.**

Prothorax red with broad median stripe black; prosternum black; 10 mm. Nevada.....38. **lateralis.**

Prothorax entirely scarlet.

Body above and beneath red, head and elytra above black; 8 mm. Cala. 39. **atripennis.**

Body beneath black.

Prosternum entirely black.

Prothorax very sparsely equally punctured; 7–8 mm. Middle and Southern States .....40. **collaris.**

Prothorax more coarsely punctured, more densely at the sides; 10 mm. Nevada.....41. **torquatus.**

Prosternum black at tip only; prothorax very sparsely punctate; 7 mm. Nevada.....42. **nevadensis.**

20.—Elytra entirely scarlet; thorax very sparsely punctate; 6–10 mm. Massachusetts to Georgia and Illinois.....43. **sanguinipennis.**

Elytra black, humeral space red; 8–9 mm. Mid. States..44. **xanthomus.**

Elytra black at apical half, red at base; 9 mm. Oregon..45. **dimidiatus.**

Elytra dull reddish yellow, with an apical piceous spot which attains neither suture apex nor margin, and is sometimer wanting; 8–12 mm. N. E. States westward to Cala., Wash. Terr., Col. and Vanc.....46. **apicatus.**

Elytra dull reddish yellow, apical third black; 7–8 mm. Washington Territory and California.....47. **affinis.**

21.—Elytra dusky with the tip and an oblique spot dull yellow, thorax often yellow; 3.5–4.5 mm. Canada, Illinois, Georgia.....48. **obliquus.**

Entirely brownish testaceous; 3 mm. Georgia to Illinois.....49. **pusio.**

Notes and Descriptions.

2. **E. insignis.**—Elongate, piceous brown, deeply not very densely punctured. Antennæ and legs dull red; the former longer than prothorax, strongly serrate, without erect hair; prothorax longer than wide, gradually narrowed from base to front, sides very slightly rounded hind angles long acute, strongly bicarinate, deeply channeled at base; striæ of elytra deep, strongly punctured, interspaces rugosely punctured; pubescence gray, coarse; 14 mm.

One male, Texas; Mr. G. Belfrage; resembles in form a *Melanotus corticinus*.

4. **E. fastus.**—Black, with brown pubescence. Head and prothorax (including prosternum) red, deeply rather densely punctured, narrowed in front, moderately rounded on the sides, not channeled, hind angles very distinctly bicarinate. Antennæ rather strongly serrate, 3d joint nearly as long as the 4th, more triangular in the male; 6.5–8 mm.

Southern California; Morrison; one pair.

Digitized by Google

5. **E. rubriventris.**—Red, head, elytra and postpectus black; prothorax longer than wide, narrowed with rounded sides from the middle to the tip, disc finely densely punctured, hind angles bicarinate, prosternum red. Antennæ not longer than prothorax, strongly serrate, 3d joint equal to 2d, united equal to the 4th, brown. Elytral striæ deep, interspaces convex, rugosely punctured; 8 mm.

One specimen collected near Las Vegas, New Mexico, by Prof. F. H. Snow.

7. **E. melinus** —Dull yellow, with yellow pubescence. Head, scutel, postpectus and antennæ black, the last are half as long as the body, slender, 3d joint but little longer than 2d; prothorax hardly longer than wide, narrowed from the base, deeply but not coarsely or densely punctured, angles bicarinate. Elytral striæ punctured, well impressed, interspaces nearly flat, punctulate; 7 mm.

Clark's Station, California; one specimen collected by Mr. A. Bolter.

14. **E. ater.**—Entirely black, not opaque, pubescence black, erect on the prothorax, which is longer than wide, slightly narrowed and rounded near the apex, densely not coarsely punctured, angles unicarinate. Antennæ as long as prothorax, not strongly serrate, 2d and 3d joints equal united as long as the 4th; 8.5 mm.

Manitou, Colorado; one specimen collected by Mr. A. Bolter.

16. **E. longicornis.**—More elongate than usual, brown with grayish pubescence. Antennæ half as long as the body, joints long, 2d and 3d united as long as the 4th; prothorax longer than wide narrowed from the base, very slightly rounded on the sides, angles divergent, unicarinate, disc deeply not coarsely nor densely punctured. Elytral striæ composed of fine punctures, interspaces flat sparsely punctulate; 9 mm.

Santa Anna River, California; one specimen collected by Mr. Bolter. Resembles greatly *Melanotus longulus*.

33. **E. subtilis.**—Black, clothed with very fine short brown pubescence. Antennæ and legs brown, the former not longer than prothorax, moderately serrate, 2d and 3d joints equal; prothorax finely densely punctured, slightly longer than wide narrowed from the base forwards, slightly rounded on the sides, angles unicarinate. Elytra with convex interspaces, densely punctulate; beneath densely punctulate, prosternum shining finely sparsely punctured; 7 mm.

One specimen collected by myself, at Lake Superior; a very peculiar species by the fineness of the sculpture, having somewhat the lustre of a Cardiophorus.

38. **E. lateralis.**—Black, pubescence dark gray, prothorax finely punctured hardly longer than wide, sides more rounded in front, hind angles unicarinate; deep red, broad dorsal vitta and prosternum black. Antennæ shorter than prothorax, moderately serrate, 2d and 3d joints united as long as the 4th; 10 mm.

Nevada; one specimen in Dr. Horn's collection.

41. **E. torquatus.**—Black, precisely similar to *lateralis*, but the disc and flanks of the prothorax are red; 10 mm.

Nevada; one specimen in Dr. Horn's collection. Perhaps only color variety of the preceding.

Digitized by Google

42. **E. nevadensis.**—Black, pubescence brown, longer than usual, sub-erect on the prothorax, which is a little longer than wide, narrowed from the base forwards, bright red finely not densely punctured, red, posterior spine black. Elytral interspaces convex, rugosely punctured. Antennæ longer than prothorax, slender, joints elongate, 2d and 3d united equal to the 4th; 7 mm.

Nevada; one specimen in Dr. Horn's collection.

47. **E. affinis.**—Black with yellow pubescence. Antennæ but little longer than prothorax strongly serrate in the male, 3d joint but little longer than 2d; prothorax a little longer than wide, more narrowed in front and rounded on the sides from the middle, deeply densely punctured, angles unicarinate. Elytra scarlet, apical third black, striæ punctured; 7–8 mm.

Washington Territory and Southern California. This species exactly resembles *E. cordatus*, except that the pubescence of the prothorax is not erect but inclined.

48. **E. obliquus** Say. The name *areolatus* is really the older name but as it applies to a rather rare variety and the other name has come into such general use it is not thought necessary to make the change.

Bibliography.

ELATER Linn.

1. **E. hepaticus** Mels. Proc. Acad. ii, p. 160; Lec. Trans. Am. Phil. Soc. x, p. 467; Candéze, Elaterides ii, p. 479.
2. **E. insignis** n. sp. supra.
3. **E. rhodopus** Lec. Pacif. R. R. Expl. and Surv. xi, p. 47; *umbricolor* Motsch. Bull. Mosc. 1859, iv, p. 385.
4. **E. fastus** n. sp. supra.
5. **E. rubriventris** n. sp. supra.
6. **E. partitus** Cand. Mem. Liege ix, 1881, p. 63 (separate).
7. **E. melinus** n. sp. supra.
8. **E. Sturmii** Germ. Zeitschr. v, p. 188; Cand. Elat. ii, p. 496, pl. 7, fig. 18.
9. **E. Phelpsii** Horn, Trans. Am. Ent. Soc. 1874, p. 22.
10. **E. Horni** Cand. Mem. Liege ix, p. 63 (separate).
11. **E. cordatus** Horn, l. c. 1871, p. 306, pl. iv, fig. 7.
12. **E. Behrensi** Horn, l. c. p. 214, pl. iv, fig. 5.
13. **E. cordifer** Lec. Proc. Acad. 1859, p. 72; *Lecontii* Cand. Elat. ii, p. 459.
14. **E. ater** n. sp. supra.
15. **E. manipularis** Cand. loc. cit. p. 478.
16. **E. longicornis** n. sp. supra.
17. **E. carbonicolor** Esch. Thon. Archiv. 11, p. 33; Mann. Bull. Mosc. 1843, p. 240; Cand. loc. cit. p. 476.
18. **E. pedalis** Germ. Zeitschr. v, 176; Cand. loc. cit. p. 481; *ursulus* Mels. Proc. Acad. ii, p. 213; Lec. Revis. p. 468; *deletus* Lec. loc. cit. p. 469.
19. **E. nigrinus** Payk. Fauna Suec. iii, p. 39; Cand. loc. cit. p. 475; *anthracinus* Lec. Ann. Mag. Nat. Hist. 1869, p. 378.

Digitized by Google

20. **E. mixtus** Herbst, Käfer x, p. 74, pl. 164, fig. 9; Lec. Rev. p. 469; Cand. loc. cit. p. 453; *lacustris* Lec. loc. cit. p. 468; *fusculus* Lec. loc. cit. p. 468; *miniipennis* Lec. loc. cit. p. 469.
21. **E. pullus** Germ. Zeitschr. v, p. 162; Cand. loc. cit. p. 454.
22. **E. nigricollis** Herbst, Käfer x, p. 73, pl. 164, fig. 7; Germ. Zeitschr. v, p. 166; Lec. loc. cit. p. 464; Cand. Elat. II, 463.
23. **E. linteus** Say, Trans. Am. Phil. Soc. vi, p. 168; Lec. loc. cit. p. 464; Cand. Elat. II, p. 462; *lugubris* Germ. Zeits. v, p. 165.
24. **E. discoideus** Fab. Syst. El. ii, p. 240; Lec. loc. cit. p. 464; Cand. Elat. II, p. 461.
25. **E. vitiosus** Lec. loc. cit. p. 465.
26. **E. laesus** Lec. loc. cit. p. 465.
27. **E. Sayi** Lec. loc. cit. p. 465; Cand. Elat. II, p. 464; *oblessus* Say, Trans. Am. Phil. Soc. vi, p. 165.
28. **E. impolitus** Mels. Proc. Acad. ii, p. 160; Lec. loc. cit. p. 467.
29. **E. socer** Lec. loc. cit. p. 467; Cand. Elat. II, p. 477.
30. **E. rubricollis** Herbst, Käfer x, p. 49, pl. 162, fig. 6; Lec. loc. cit. p. 464; Cand. Elat. II, p. 455; *verticinus* Beauv. Ins. p. 214, pl. 9, fig. 6.
31. **E. semicinctus** Rand. Bost. Journ. ii, p. 10; Lec. loc. cit. p. 465; Cand. Elat. II, p. 462; *protervus* Lec. loc. cit. p. 471.
32. **E. militaris** Harris, Hartf. Trans. 1836, p. 70, pl. 1, fig. 1; Germ. Zeitschr. v, p. 166.
33. **E. subtilis** n. sp. supra.
34. **E. moerens** Lec. Proc. Acad. 1861, p. 347.
35. **E. luctuosus** Lec. loc. cit. p. 466; Cand. Elat. II, p. 478.
36. **E. nigricans** Germ. Zeitschr. v, p. 176; Lec. loc. cit. p. 468; Cand. Elat. II, p. 480; *testaceipes* Mels. Proc. Acad. ii, p. 213; *molestus* Lec. loc. cit. p. 467.
37. **E. rubricus** Say, Ann. Lyc. 1, p. 261; Lec. loc. cit. p. 470; Cand. Elat. II, p. 464; *concinnus* Germ. Zeitschr. v, p. 170.
38. **E. lateralis** n. sp. supra.
39. **E. atripennis** Horn, Trans. Am. Ent. Soc. 1871, p. 306; *violaceipennis* Cand. Mem. Liege. 1881, p. 62 (separate).
40. **E. collaris** Say, Ann. Lyc. 1, p. 268; Lec. loc. cit. p. 470; Cand. Elat. II, p. 456; *thoracicus* Herbst, Käfer x, p. 51, pl. 162, fig. 8.
41. **E. torquatus** n. sp. supra.
42. **E. nevadensis** n. sp. supra.
43. **E. sanguinipennis** Say, Journ. Acad. iii, p. 177; Lec. loc. cit. p. 469; Cand. Elat. II, p. 452.
44. **E. xanthomus** Germ. Zeitschr. v, p. 168; Cand. Elat. II, p. 465; *humeralis* Mels. Proc. Acad. ii, p. 159; Lec. loc. cit. p. 471.
45. **E. dimidiatus** Lec. Proc. Acad. 1861, p. 347.
46. **E. apicatus** Say, Trans. Am. Phil. Soc. vi, p. 170; Lec. loc. cit. p. 466; Cand. Elat. II, p. 459; *melanopygus* Germ. Zeitschr. v, p. 161; *phœnicopterus* Germ. loc. cit.; Lec. loc. cit. p. 466; Cand. Elat. II, p. 448.
47. **E. affinis** n. sp. supra.
48. **E. obliquus** Say, Trans. Am. Phil. Soc. vi, p. 174; Lec. loc. cit. p. 470; Cand. Elat. II, p. 469; *areolatus* Say, Journ. Acad. iii, p. 167; Lec. loc. cit. p. 471; Cand. Elat. II, p. 471; *scitulus* Germ. Zeitschr. v, p. 168.
49. **E. pusio** Germ. loc. cit. p. 169; *luteolus* Lec. loc. cit. p. 471.

Digitized by Google

Unrecognized Species.

E. ignobilis Boh. Eug. Resa, p. 68.

E. rufipes Beauv. Ins. p. 214, pl. 9, fig. 9.

The localities given for the species collected during the Eugenies Resa are not reliable in all cases, and the species may be from any other region than California. *E. rufipes* is too briefly described to make its recognition certain.

AGRIOTES Esch.

The occurrence of several new species affords an opportunity for a renewed study of the genus in which greater stress is laid on structural characters and less on color and other variable qualities.

Hind coxal plates very gradually dilated internally and not twice broader at inner third than externally.....2.

Hind coxal plates rather suddenly dilated within, usually more than twice as broad at inner third as externally.....10.

2.—Mandibles robust, the tip broad, chisel-shaped; form robust; thorax very convex, coarsely and densely punctured; 7–9 mm. Atlantic States and Canada. 1. **mancus.**

Mandibles much more slender, tips sub-acute.....3.

3.—Prothorax similarly, usually coarsely punctured over the entire surface.....4.

Prothorax coarsely punctured in front, very finely punctulate posteriorly; color variable, usually piceous, often with elytra dull red; 8–11 mm. Can. and Lake Superior.....2. **stabilis.**

4.—Antennæ with joints 2–3 each distinctly shorter than joint 4.....5.

Antennæ with joints 2–3 each equal in length to joint 4 and scarcely narrower.9.

5.—Lateral margin of thorax distinct in its entire length.....6.

Lateral margin of thorax obliterated except near the hind angles.....8.

6.—Hind angles of thorax very distinctly carinate.....7.

Hind angles of thorax not perceptibly carinate; color pale brown with grayish pubescence; 7–8 mm. Mass., Illinois, Kansas and Texas.....3. **insanus.**

7.—Variable in color, sometimes entirely piceous, or with the sides of thorax dark red, again with the elytra ferruginous, or entirely ferruginous; 9–12 mm. N. E. States, through Canada to Hudson's Bay, British Columbia, Oregon, California.....4. **fucosus.**

Thorax much less convex than in *fucosus*, the punctuation less coarse and distinct, not crowded; color piceous, elytra dark ferruginous, legs pale; 10 mm. Oregon.....5. **ferrugineipennis.**

8.—Parallel, thorax very coarsely and densely punctured; color variable, often entirely piceous usually with ferruginous elytra; 7–9 mm. California. 6. **imperfectus.**

Form slender, piceous, thorax sparsely punctate; 6.5–7.5 mm. Oregon. 7. **sparsus.**

9.—Lateral margin of thorax indistinct in the middle of its length and very much deflexed in front; abdomen rather sparsely punctate; 9 mm. Pennsylvania and Ohio.....8. **pubescens.**

Lateral margin of thorax sharply defined in its entire length; abdomen densely punctulate; thorax piceous, elytra ferruginous; 8.5 mm. Newfoundland, N. H. and Canada.....9. **limosus.**

Digitized by Google

10.—Lateral margin of thorax sharply defined in its entire length.....11.
Lateral margin of thorax very incomplete.
Margin obtuse in the greater part of its length; form robust, piceous, pubescence dark brown nearly erect; 8 mm. Cal..... .....10. **hispidus.**
Margin obsolete in front; abdomen sparsely punctate; 7.5-8 mm. Oregon, Washington Territory.....11. **opaculus.**
11.—Antennæ with joints 2-3 each shorter than the fourth.
Third joint of antennæ shorter than second; form slender, brown, hind angles of thorax feebly carinate; flanks of prothorax beneath not densely punctate, shining; 5.5-9.5 mm. Georgia to Canada and Illinois.
12. **oblongicollis.**
Third joint of antennæ distinctly longer than the second; piceous, elytra dull red, hind angles of thorax strongly carinate; flanks of prothorax beneath densely punctate and opaque; 8 mm. Western Nevada.
13. **nevadensis.**
Antennæ with joints 2, 3 and 4 very nearly of equal length.....12.
12.—Abdomen finely, closely punctate .....13.
Abdomen coarsely, not closely punctate .....15.
13.—Prothorax above and its flanks beneath coarsely not densely punctate, rather shining.....14.
Prothorax and flanks densely more finely punctate, sub-opaque; piceous, elytra dull red, the apical third piceous; 7.5 mm. Cal.....14. **apicalis.**
14.—Punctuation of thorax coarse and deep, the punctures more distant from each other than their own diameter; color entirely piceous; 8 mm. Vermont.
15. **avulsus.**
Punctuation of thorax very closely placed; piceous, elytra with long humeral space dull red; 8 mm. California.....16. **Thevenetii.**
15.—Antennæ not extending beyond the hind angles of the thorax, the intermediate joints (4-8) not longer than wide; thorax dull red, head and elytra almost black; 7 mm. Yosemite, California.....17. **torquatus.**
Antennæ longer than the head and thorax, joints all longer than wide; piceous, elytra dirty yellow; 6-7.5 mm. Idaho and Wyoming.
18. **montanus.***

Notes and Decriptions.

4. **A. fucosus** Lec.—Very variable in color. As a general rule the specimens with paler thorax are somewhat more coarsely punctured. In California an entirely ferruginous form occurs.

5. **A. ferrugineipennis** Lec.—This species is far less convex than *fucosus*, and the punctuation of the thorax is less deep and more distinct, the punctures standing well apart.

6. **A. imperfectus** n. sp.—Form parallel, piceous, sparsely clothed with pale brownish pubescence, elytra often ferruginous. Antennæ as long as the head and thorax, brownish, joints 2-3 sub-equal, each slightly shorter than the fourth, 4-10 equal serrate, 11 longer. Head very coarsely and closely punctate. Thorax

* The following species are omitted from the table: *A. inversus* Cand. is Sericosomus flavipennis Motsch. *A. protractus* Horn, cannot remain in Agriotes, but will constitute a new genus of Athoites, and will be described by me in a future paper (G. H. Horn).

Digitized by Google

slightly longer than wide, parallel ♂, slightly wider posteriorly ♀, sides straight, slightly arcuate at front angles, hind angles not divergent beyond the line of the sides, carinate, disc convex very coarsely and closely punctate, lateral margin almost entirely obliterated except near the hind angles. Elytra striate, striæ punctured, intervals flat, closely punctate, rugose at base. Prothorax beneath coarsely not closely punctate, shining. Metathorax and abdomen more finely and closely punctate. Hind coxal plates very little broader internally Length 7–9 mm.

This species might be mistaken for some of the feebler forms of *fucosus*, but the absence of the lateral margin of the thorax will distinguish it. The apical border of the thorax and its hind angles are always paler than the disc.

California, southern Coast Range.

7. **A. sparsus** n. sp.—Elongate, piceous, clothed with grayish pubescence, legs and antennæ ferruginous. Antennæ slender serrate from the fourth joint, joints 2–3 each shorter than joint 4, the third shorter than the second. Head coarsely sparsely punctate. Thorax one-fourth longer than wide, sides parallel. slightly arcuate near the front angles. hind angles slightly divergent, carinate, the carina close to the margin, lateral margin entirely obliterated except near the hind angles, surface sparsely punctate, the punctures not coarse, distant at the middle of the disc. Elytra striate, striæ punctured, intervals slightly convex, punctured, somewhat rugose at base. Body beneath sparsely punctate, abdomen more finely, sparsely pubescent. Hind coxal plates very gradually broader internally. Length 6.5–7.5 mm.

A small slender species which might casually be mixed with *Sericosomus lateralis*.

Occurs in Oregon and Washington Territory.

10. **A. hispidus** n. sp.—Form nearly as robust as *mancus*, piceous, slightly shining, sparsely clothed with brownish pubescence. Antennæ brown, attaining the hind angles of the thorax, joints 2–3 equal, a little shorter than the fourth, outer joints feebly serrate. Head densely, moderately coarsely punctured. Thorax a little longer than wide, sides in front arcuate, posterior two-thirds parallel, hind angles slightly divergent, carinate, lateral margin very obtuse and indistinct, disc convex coarsely and deeply punctured, the punctures somewhat denser near the base and very much denser at the sides. Elytra more feebly striate on the disc than at the sides, the discal striæ more finely punctured, intervals flat on the disc, more convex at the sides, moderately closely punctate, somewhat rugulose at base. Prothorax beneath densely punctate, the flanks more densely and opaque. Metathorax rather finely and densely punctate. Hind coxal plates rapidly broader internally, the free angle very obtuse. Length 8 mm.

The pubescence of the surface while short is erect.

One specimen ♂, Clark's Station, California.

13. **A. nevadensis** n. sp. –Piceous, sparsely clothed with pale brown pubescence. Elytra, hind angles of thorax and legs dull red. Antennæ brown, as long as the head and thorax, joints 2–3 each shorter than the fourth, third a little longer than the second, 4–10 very feebly serrate. Head black, coarsely and densely punctate. Thorax very little longer than wide, sides nearly parallel, the hind

Digitized by Google

angles slightly divergent, carinate, lateral margin entire, disc convex, coarsely and closely punctate. Elytra rather feebly striate, striæ punctured, intervals flat, closely punctate, rugose at base. Prothorax beneath very densely punctate, the flanks opaque. Metathorax and abdomen finely and very closely punctulate. Hind coxal plates rapidly wider internally, the free angle rounded; 8 mm.

This species might readily be mistaken for *limosus*, but the form of the hind coxal plates and the punctuation of the prothorax beneath will distinguish it.

Western Nevada (Morrison). Cabinet of Dr. Horn.

14. **A. apicalis** n. sp.—Fusiform, piceous, opaque. Elytra dull yellow with apical fourth piceous, legs ferruginous. Antennæ piceous, not attaining the tips of the hind angles of the thorax, joints 2–11 equal, 4–10 distinctly serrate. Head densely punctate, feebly shining. Thorax longer than wide, gradually narrower to the front, sides slightly arcuate in front, posteriorly straight, the hind angles not divergent beyond the line of the sides and strongly carinate, lateral margin acute, disc moderately convex, densely punctate and opaque, sparsely clothed with short gray pubescence. Elytra gradually narrower to tip, twice as long as the thorax, striate, striæ punctured, intervals slightly convex, moderately densely punctate, slightly rugose at base, sparsely clothed with gray pubescence. Prosternum moderately closely punctate, flanks very densely punctate and opaque. Metasternum and abdomen closely punctate and finely pubescent. Hind coxal plates rapidly broader internally, the free angle very obtuse. Length 7.5 mm.

Rather more fusiform than our other species of this genus. The piceous space at the apex of the elytra extends slightly along the suture and side margin.

One specimen ♂, Yreka, California.

17. **A. torquatus** n. sp.—Form parallel, piceous. Thorax dull red, legs ferruginous. Antennæ brown, joints 2–11 equal, 4–10 distinctly serrate. Head piceous, coarsely and closely punctate. Thorax longer than wide, sides nearly parallel, slightly arcuate in front, hind angles feebly divergent, distinctly carinate, lateral margin distinct, acute, disc moderately convex, coarsely and very closely punctate, sparsely clothed with pale brown pubescence. Elytra rather deeply striate, striæ punctured, intervals slightly convex, punctate, rugose near the base, sparsely pubescent. Prothorax beneath dull red, the prosternum piceous posteriorly and not densely punctate, flanks more coarsely and densely punctate. Metasternum and abdomen more finely but not very closely punctate. Hind coxal plates rather abruptly dilated internally the free angle obtuse. Length 7 mm.

This species resembles in form and color some of the smaller varieties of *Corymbites conjungens*.

Yosemite Valley, California.

18. **A. montanus** n. sp.—Form robust, piceous, elytra luteous, legs yellowish brown. Antennæ yellowish brown not attaining the hind angles of the thorax, joints 2–11 equal, 4–10 feebly serrate. Head coarsely and deeply punctate. Thorax a little longer than wide, sides parallel, slightly arcuate at the front angles, hind angles carinate, not divergent, lateral margin distinct, disc moderately convex, coarsely, closely and equally punctate, very sparsely pubescent, general color pice-

Digitized by Google

ous, apical border and hind angles paler. Elytra barely twice as long as the thorax, sides somewhat arcuate, striate, striæ punctured, intervals slightly convex and rather rugosely punctate, sparsely pubescent. Prothorax beneath coarsely, not closely punctate. Metasternum and abdomen more finely and densely punctate. Hind coxal plates abruptly broader internally, the free angle nearly rectangular. Length 6–7.5 mm.

A rather small species with the general form of *Monocrepidius auritus*. Occurs in Idaho and Wyoming.

Bibliography.

AGRIOTES, Esch.

1. **A. manous** Say Journ. Acad. iii, p. 171; Lec, Trans. Am. Phil. Soc. x, p. 455; Cand. Elat. iv, p. 388; *obesus* Harris, Ins. inj. to veg. ii, p. 49; *striatulus* Mels. Proc. Acad. ii, p. 217; *truncatus* Mels. loc. cit.
2. **A. stabilis** Lec. loc. cit. p. 457; Cand. loc. cit. p. 457; Cand. loc. cit. p. 376.
3. **A. insanus** Cand. loc. cit. p. 376; *sordidus* Lec. loc. cit. p. 457.
4. **A. fucosus** Lec. loc. cit. p. 456; Cand. loc. cit. p. 375; *collaris* Lec. loc. cit. p. 456; Cand. loc. cit. p. 374.
5. **A. ferrugineipennis** Lec. Proc. Acad. 1861, p. 348.
6. **A. imperfectus** Lec. supra.
7. **A. sparsus** Lec. supra.
8. **A. pubescens** Mels. loc. cit. p. 217; Lec. loc. cit. p. 457, Cand. loc. cit. p. 377.
9. **A. limosus** Lec. loc. cit. 457; Cand. loc. cit. p. 378.
10. **A. hispidus** Lec. supra.
11. **A. opaculus** Lec. Proc. Acad. 1859, p. 385.
12. **A. oblongicollis** Mels. loc. cit. p. 218; Lec. loc. cit. p. 218; Lec. loc. cit. p. 456; Cand. loc. cit. p. 402; *isabellinus* Mels. loc. cit.
13. **A. nevadensis** Lec. supra.
14. **A. apicalis** Lec. supra.
15. **A. avulsus** Lec. loc. cit. p. 457; Cand. loc. cit. p. 403.
16. **A. Thevenetii** Horn, Trans. Am. Ent. Soc. iv, 1872, p. 148.
17. **A. torquatus** Lec. supra.
18. **A. montanus** Lec. supra.

DOLOPIUS Esch.

While preparing the species of Agriotes for publication finding in the same box a very large series of *Dolopius lateralis* with all variations, I have found that *D. macer* Lec. cannot be retained as distinct. It is more slender than the majority of the other *D. lateralis*, and entirely piceous, but either character is observed in the series, so that they have no value in specific definition.

D. simplex Motsch. is one of the bicolored forms of *lateralis* so common in California (G. H. Horn).

Digitized by Google

PYROPYGA Motsch.

P. simplex.—Elongate-oval, entirely black. Prothorax broadly flattened and slightly punctured at sides and tip, flattened part reflexed; disc alutaceous with very indistinct dorsal line. Antennæ with the joints 3–11 equal in length. Light-organs entirely wanting. Length 8 mm.

Arizona, one pair Mr. Morrison. Rather broader than P. nigricans with the sides of the elytra more widely flattened.

LAMPROHIZA Motsch.

L. Riversi.—Front wide, eyes moderate in size, convex. Antennæ 11-jointed, 1st and 2d joints equal, together as long as the 3d, the following ones are equal in length, but gradually narrower. Abdominal segments strongly lobed at the sides, last dorsal of male truncate and broadly emarginate. Prothorax with two small transparent spots near the tip; rather strongly punctured, sides opaque, broadly flattened and reflexed; disc shining, uneven, sub-carinate. The last two ventral segments are yellowish, but dull, so that they may or may not be light-organs. Body above black, prothorax dull reddish yellow, with a black dorsal spot from the middle to the base. Last dorsal segments piceous, dull testaceous at the sides, last two ventrals yellow. Elytra strongly scabrous-punctured. Length 4.5 mm.

One male Sonoma Co., Cala., Mr. J. J. Rivers, of the University of California, to whom I dedicate it in recognition of his promotion of Scientific interests on the Pacific coast.

This insect greatly resembles *L. inaccensa*, but is narrower.

MICROPHOTUS Lec.

M. angustus Lec. A female of this species, undistinguishable from those collected in Colorado, Oregon and California, was found by Mr. Hubbard at Hillsboro', Fla.

PLEOTOMUS Lec.

P. nigripennis.—Of the same form and sculpture as P. pallens, but of a bright orange color. Prothorax a little longer with the apex less obtusely rounded. Elytra black. Length 13 mm.

One male, Arizona, Mr. Morrison.

SPATHIZUS Lec. n. g. Lampyridæ.

Male.—Antennæ three fourths as long as the body; joints 3–11 each furnished with a long flat process, the outer ones being longer, and narrowed at base; 11th similar to the process of the 10th. Head as broad as the prothorax, eyes moderate convex; maxillary palpi with the last joint pointed, as long as the preceding. Prothorax quadrate, margined at the sides from base to tip. Elytra dehiscent, narrrow and rounded at apex, scabrous-punctured. Legs short, claws divaricate small, broader at base. Sixth ventral broadly emarginate, genital segment small, and prominent, slightly narrower at base; last dorsal truncate and emarginate.

Digitized by Google

This genus is intermediate between Cenophengus and Tytthonyx, but differs from both by the third joint of the antennæ having a process. The gular sutures are confluent behind the mouth, and the triangular space is deeply concave, as in other Phengodini.

S. bicolor.—Black, prothorax and under surface bright reddish yellow; mouth and sides of head behind the eyes testaceous. Head densely punctulate, prothorax alutaceous, margined at sides and less strongly at base of apex; disc channeled. Elytra not densely but coarsely punctured, with a strong discoidal costa and a shorter one nearer the suture. Length 7.5 mm.

Several males were collected in Arizona by Mr. Morrison.

TELEPHORUS DeGeer.

T. costipennis.—Black, prothorax yellow, with a broad dorsal vitta, which is angularly dilated just behind the middle. Elytra very coarsely punctured with a well-marked discoidal costa and a shorter one nearer the suture; mouth sometimes tinged with testaceous. Length 6 mm.

Florida, Messrs. Hubbard and Schwarz. Quite similar to T. lineola, and differs only by the more coarsely sculptured and costate elytra.

POLEMIUS Lec.

P. princeps.—Black, head smooth, front whitish yellow. Prothorax smooth, shining, broader than long, nearly truncate at base, sides broadly reflexed, rounded into the apex with the front angles obliterated, hind angles rectangular; pale red, with a black dorsal vitta not quite attaining base or apex, deeply nicked at the sides about one-third from the hind angles. Elytra finely scabrous and pubescent, margined with testaceous along the sides. Length 14 mm.

Arizona, one male.

P. strenuus.—Similar to the preceding, but the black dorsal vitta is strongly dilated in front of the base, and the elytra are not margined with yellow. Length 9 mm.

One female, Arizona, Mr. Morrison. The prothorax is twice as wide as long and rounded on the sides into the apex; they are more narrowly reflexed than in P. princeps, and as is the case in all females, not nicked. The elytra are somewhat dilated behind the humeri in both, and the usual three faint costæ are quite apparent.

P. marginicollis.—Black, head smooth, mouth whitish. Prothorax trapezoidal hind angles rectangular, front ones rounded, sides nearly straight, apex broadly rounded; smooth, pale yellow, with a broad dorsal vitta attaining the tip and to the narrow basal margin, broader in front of the base, sides reflexed, edged with black. Elytra scabrous-punctured, slightly dilated behind the humeri, with the costæ very feeble. Length 7 mm.

One female, New Mexico; Mr. Ulke. These three species have the antennæ feebly serrate.

Digitized by Google

SILIS Charp.

S. atra.—Entirely black, prothorax lobed at base and deeply foveate, antebasal excavation deep, hind angles prolonged and carinate, appendage straight, front angle of excavation rectangular. Antennæ as long as the body, third joint as long as the fourth. Length 5 mm.

One male, Washington Territory. Resembles S. cava, but differs by the longer hind angles of prothorax and by the uniform black color.

MALTHODES Kies.

M. bicolor.—Black, head and prothorax red; the former wider than prothorax, eyes very convex and prominent. Prothorax wider than long, narrowly margined. Elytra with punctures arranged nearly in rows, two-thirds as long as the elytra. Length 5 mm.

One female, Arizona; the 2d and 3d joints of the antennæ are equal, each a little shorter than the 4th. The head and prothorax are not punctured, the former opaque, the latter shining, not channeled. By the form and sculpture of the prothorax this species seems intermediate between Malthinus and Malthodes.

HYDNOCERA Newm.

H. longa.—Greenish black, pubescence long, erect, gray; mouth, antennæ, front legs, middle tibiæ and tarsi, and hind tarsi testaceous. Elytra dark blue, strongly punctured, becoming granulate near the tips, which are separately rounded, and distinctly serrate. Prothorax longer than wide, anterior constriction well defined, sides broadly and obtusely dilated. Length 6–7 mm.

Arizona, several specimens were collected by Mr. Morrison.

THECA Muls.

T. striatopunctata.—Oval, convex, dull black, pubescent with erect gray hairs. Prothorax obliquely narrowed from the base, punctures of the disc with sparse shallow punctures becoming weaker at the sides. Elytra with strongly punctured striæ. Antennæ ferruginous. Length 2 mm.

California, one specimen. Of the same size and form as T. profunda, but differs by the strongly punctured elytral striæ and less punctured prothorax.

PHYMATODES Muls.

P. ater.—Black, very sparsely and finely pubescent. Head punctured; prothorax one-half wider than long, strongly punctured, much rounded on the sides. Elytra strongly and equably punctured. Antennæ and legs tinged with piceous. Length 6.5 mm.

One female collected at Buffalo, N. Y., and kindly given to me by Mr. F. Zesch. The antennæ are slender and about two-thirds as long as the body.

CRIOPROSOPUS Serv.

C. lateralis.—Black, clothed above and beneath with fine, erect, ashy pubescence. Beneath finely, above deeply and coarsely punctured. Prothorax

Digitized by Google

strongly angulated at the sides behind the middle, then concavely narrowed to the base; sides with a broad orange border. Scutel narrow, acute, black. Elytra with narrow side margin and broad transverse fascia, at the first fourth of the length bright orange. Antennæ as long as the body. Mesosternum suddenly declivous in front. Length 11 mm.

One specimen, Bosque Co., Texas; Mr. Belfrage. This is the smallest Trachyderide known to me.

PURPURICENUS Serv.

P. dimidiatus.—Black, opaque, densely and coarsely punctured, disc of prothorax red, with a small dorsal callus, edges black. Elytra with the anterior half red, basal margin black. Length 18 mm.

One female collected at Yreka, Cala., and kindly presented to me by Mr. Duenkel; the antennæ are shorter than the body and not at all serrate. The coarser and denser punctuation, and different coloration will enable this species to be readily recognized; it is much more Western in its habitat than the other species of the genus.

OXOPLUS Lec.

O. marginatus Lec.—A small female of this species (14 mm.) agrees perfectly with the large males from Lower California; the antennæ are a little shorter than the body; this would indicate that *O. corallinus* in which the antennæ are comparatively shorter, and distinctly though not strongly serrate, must be retained for the present as a separate species.

CROSSIDIUS Lec.

C. discoideus (Say). This species extends into Idaho and Ariz.

PTEROPLATUS Serv.

P. divisus.—Ferruginous, antennæ, tarsi, tip of middle and whole hind tibiæ, abdomen and posterior half of elytra black. Prothorax strongly punctured, disc flattened, sides with a well defined elliptical impression of a darker tinge. Elytra cylindrical, orange colored deeply punctured, hinder half black, limited by an oblique line running backwards from the suture. Length 9 mm.

Dallas, Texas; Bolles. The elytra have four costæ, and in form, size and sculpture, this insect is precisely similar to *P. floridanus*. The hairs are very few and short.

P. rufipennis.—Black, elytra reddish yellow, densely punctured, quadricostate, wider behind, and flattened on the disc. Prothorax as long as wide, sericeous, densely punctured, disc flattened, ornamented with two red vittæ, sides impressed as usual, sub-angulated behind the middle. Head with a medial red vitta extending into the mouth. Length 11–13 mm.

Arizona, Mr. Morrison. The antennæ are half as long as the body and serrate in two specimens before me, one of which was collected near Las Vegas, N. Mex.

Digitized by Google

P. apicalis.—Scarlet, tarsi and antennæ black, first joint of the latter and scutel brown-red. Elytra sculptured as in the preceding, apical fourth black. Prothorax as in the preceding but angulated at the middle. Length 11-17 mm.

Arizona; many specimens were collected by Mr. Morrison. The antennæ of the female are half as long, those of the male three-fourths as long as the body, more strongly serrate in the former, the pubescence is short but dense in this as in the preceding and next species; they may be only color varieties of one form, but the differences parallel those of certain *Lycidæ* so perfectly that I am disposed for the present to view them as distinct.*

P. ignitus.—Scarlet, sericeous pubescent. Antennæ, tarsi and tips of middle and hind tibiæ black. Metasternum and abdomen more or less piceous. Length 11-13 mm.

Arizona, found abundantly by Mr. Morrison. I have only females.

LIOPUS Serv.

L. centralis.—Rather stout in form, like L. crassulus, densely covered with short pale gray prostrate hair mottled with dark spots more conspicuously than in that species; sides of prothorax oblique in front of the spine which is strong, acute and situate just behind the middle. Elytra with small tufts of black scales; there is a common rounded sutural spot behind the middle and a lateral one in front of the middle, there is also a small black spot near the scutel, which is dark, and two clouds near the side behind the middle. Length 6.5 mm.

Arizona, one specimen.

LEMA Fabr.

L. balteata.—Shining, black, abdomen and transverse band at the middle of the elytra bright rufous. Elytra bluish, the punctures of the rows are deep, but well separated. Length 6 mm.

Arizona, Mr. Morrison. Looks like L. solani, but is quite different by coloration and less approximate elytral punctures.

L. concolor.—Black with a greenish tinge. Prothorax a little longer than wide, sparsely punctured, constriction less abrupt than in *L. peninsulæ*, sides much less rounded before. Elytra with striæ composed of approximate deep but not coarse punctures. Length 4 mm.

Las Vegas, N. Mex., Prof. F. H. Snow; one specimen. Similar to *L. cornuta*, but differs by coloration, and by the elytral striæ less close, and composed of smaller punctures; the striæ are not fainter behind. The head has a deep puncture on the vertex.

---

* As remarked by Dr. LeConte it is doubtful whether *rufipennis* and *ignitus* are not color varieties of one species. At all events *rufipennis* should be compared with *Elytroleptus Alfredi* Dugès, La Naturaleza, v, p. 185, no mention of which is made by Mr. H. W. Bates in the Biologia Cent. Am. It is possible that *Alfredi* and *rufipennis* are varieties of *Pteroplatus pallidus* Thoms. (G. H. Horn)

Digitized by Google

COSCINOPTERA Lac.

C. dorsalis.—Black, clothed with prostrate white hair, which is shorter and denser on the under surface. Prothorax densely not coarsely punctured, with a broad smooth dorsal stripe. Elytra more strongly punctured than the thorax, and with no trace of striæ. Length 5 mm.

One specimen, Arizona.

As stout as *C. dominicana*, but much more hairy with a very conspicuous dorsal vitta.

C. bifaria.—More cylindrical, of the same form as *C. axillaris* densely punctured, clothed with prostrate white hair shorter and denser on the under surface. Prothorax without smooth dorsal line. Elytra with very faint traces of striæ here and there among the punctuation; there is a small marginal red spot at the humeri. Length 4.5 mm.

One specimen, Arizona. The punctures of the elytra are distinctly of two sizes, the larger ones having a tendency to form rows; the prothorax is densely but less strongly punctured.

C. canella.—Black, of the same form and sculpture as the preceding but the humeral red spot is larger and quadrate, as in *C. axillaris*. It is, however, distinguished by the different punctuation of the elytra, which is not of uniform size. Length 5 mm.

Southern California; not rare.

C. vittigera Lec. A variety having the elytra marked with a large red humeral spot instead of a long stripe.

Occurs in Colorado and Arizona.

EURYSCOPA Lac.

Eu. vittata.—Specimens of this species were collected in Arizona by Mr. Morrison, in which the red color is not prolonged forming a broad vitta, but cut off about the front third; the humeral callus is dark. They thus resemble *Eu. Lecontii* Cr., but the prothorax is much more finely punctured.

Eu Lecontii Caotch. A small specimen of this species was found in Southern California by Hardy which has only a very small red marginal spot at the humeri.

SAXINIS Lac.

S. apicalis.—Blackish blue, with white pubescence beneath. Prothorax convex, finely but deeply punctured, basal lobe broadly feebly produced, margined as usual. Elytra with a humeral red spot and another rounded one near the tip; punctured in rows, interstrial spaces sparsely punctulate, epipleural lobe large, obtusely angulated. Length 6 mm.

Arizona, Mr. Morrison. Cylindrical, like S. omogera, but much larger, and with the epipleural lobe of a different form.

Digitized by Google

TRICHOTHECA Baly.

T. vagans.—Brown, pubescent, with coarse hair of a grayish color, densely punctured. Elytral punctures stronger, arranged in closely approximate rows. Antennæ testaceous, darker towards the tip. Length 5 mm.

Texas; one specimen collected by Belfrage. This insect is undistinguishable from our common Xanthonia except by the larger size and thicker front thighs, which are armed with a large tooth. This is another instance of remarkable geographical distribution; the single species previously known occurs in Northern India.

GRAPHOPS Lec.

This genus includes those species, which, unaware of the previous use of the name by Blanchard, I had grouped as Heteraspis (Coleopt. Kansas and New Mexico, 23). It seems allied to the Malaysian Scelodonta, but differs by the thighs having no tooth, and by the slender tibiæ. The characters are in the surface being pubescent, and the head having two deep impressed lines connected in front between the antennæ running obliquely backwards and curving around the upper and back margin of the eyes; there is also a medial line more or less impressed; in Metachroma the lines are in front of the antennæ, and are sometimes united between their insertions by a transverse line. The prosternum has a straight outline beneath; the claws are variable in form and afford a convenient basis for the separation of the species. The following table expresses the relation between the species:

Prothorax feebly margined at base; clypeus emarginate.....2.
Prothorax strongly margined at base.....3.

2.—Prothorax finely and densely punctured, elytra punctulate, with striæ of small approximate punctures, becoming obsolete behind; color green, pubescence coarse. Length 5 mm. Kansas.....**beryllinus.**
Prothorax strongly and densely punctured, elytra alutaceous, striæ small, approximate, punctures becoming obsolete behind; form more elongate, color blackish green, pubescence coarse. Length 4 mm. Colorado..**obscurus.**
Form of beryllinus, prothorax less densely punctured; elytra punctulate, striæ composed of larger, less approximate punctures becoming obsolete behind; color coppery, green, or even blackish. Length 4–4.5 mm. Illinois, Texas, Kansas.....**varians.**

3.—Clypeus truncate; pubescence coarse.....4.
Clypeus emarginate.....5.

4.—Coppery, thinly pubescent; head strongly punctured, alutaceous, prothorax punctured, at the sides rugose; elytra punctulate, striæ composed of distant larger ones, obsolete behind, sometimes indistinct. Length 4 mm. Middle States; Texas.....**pubescens.**
Bronze or coppery, thinly pubescent; stouter and smaller than pubescens, the thorax is rugosely punctured over the whole disc, and the elytra are punc-

Digitized by Google

tulate with very obsolete rows of larger ones. Length 2.5 mm. New York to Texas and Florida ..... **curtipennis.**

5.—Coppery, thinly clothed with white hair; head and prothorax punctured not rugose; elytra punctulate, striæ composed of distant larger punctures; form as in curtipennis. Length 2.5 mm. Middle and Southern States. **marcassitus.**

Coppery, or green, thinly clothed with very short white erect pubescence; head alutaceous, sparsely, prothorax more densely punctured; elytra uniformly punctured, striæ obsolete, indicated only by the short hairs being arranged in rows. Length 3–4 mm. Texas..... **simplex.**

Elongate, green or coppery, thinly clothed with long coarse white hair; head feebly, prothorax irregularly punctured, with indistinct smooth spots; elytra punctulate, striæ composed of conspicuously larger distant punctures. Length 4 mm. Colorado..... **nebulosus.**

Bibliography.

1. **G. pubescens** Mels (Heteraspis). Pr. Acad. Nat. Sci. Phil. iii, 169; Crotch, ibid. 1873, 34.

5. **G. curtipennis** Mels (Heteraspis). ibid. iii, 169; Crotch, l. c., 35.

6. **G. marcassitus** Crotch, ibid. 35. I have excluded the basal margin of the elytra mentioned by Crotch, as well as the ungual tooth from the specific characters, as leading to illusive results.

7. **G. simplex.** The elytra are punctured as in Xanthonia.

8. **G. nebulosus** Lec. Coleoptera of Kansas, etc., 23; *smaragdulus* Lec. ibid. 24. This species has the same form as G. varians, but differs by the irregularly punctured prothorax being more strongly margined at the base. The pubescence is partly abraded, giving a nebulous appearance, as is often the case in other species.

COLASPIS Fabr.

C. arizonae Crotch, l. c., 45. This species varies greatly in the color of the elytra; in the specimen described they are entirely red, but usually they are of a dark metallic green color, with the entire border red, and transverse band at the first fourth extending from the suture nearly to the side border.

LUPERUS Oliv.

L. maculicollis.—Greenish black; prothorax orange, shining, obsoletely punctulate, finely margined, slightly rounded on the sides with a long black dorsal spot and a smaller lateral one. Elytra shining blue, finely punctured, with slight traces of striæ. Antennæ fuscous, lower joints and mouth testaceous. Length 6–7 mm.

San Diego, Cala.; found abundantly by Mr. O. N. Sanford. The antennæ are half as long as the body in both sexes; the last ventral is impressed in the male. The lateral thoracic spots are frequently reduced to mere dusky clouds; there are no discoidal impressions.

Digitized by Google

L. varicornis Lec.—This pale colored little species varies in the color of the antennæ, which are sometimes entirely black, sometimes wholly pale.

Occurs in Kansas, Texas and Arizona, and is often an injury to vegetation.

L. torquatus.—Black, prothorax slightly wider than long, very slightly rounded on the sides, bright yellow, distinctly punctulate. Elytra blue, finely and deeply punctured. Length 3 mm.

San Mateo and Mariposa, Cala., Mr. Crotch and Mr. Thevenet.

PHYLLOBROTICA Redt.

P. livida.—Dirty dull yellow. Antennæ, except at base, and metasternum fuscous. Prothorax wider than long scarcely punctulate, very slightly rounded on the sides. Elytra alutaceous, punctulate. Length 7 mm.

Arizona, Mr. Morrison. The third joint of the antennæ is a little longer than the second but shorter than the third.

PHYLLECTHRUS Lec.

P. texanus.—Bright yellow, shining, smooth. Elytra black, with the sides narrowly bordered with yellow. Antennæ fuscous, 10-jointed in the male. Length 3 mm.

Texas. Belfrage; the prothorax has a vague transverse discoidal impression as usual; it resembles P. gentilis and nigripennis, but differs in the coloration.

ANDROLYPERUS Crotch.

A. maculatus.—Scarlet, smooth, head, antennæ, legs, meso- and metasternum, scutel, and two spots on each elytron black. Length 8 mm.

San Diego, Cala. This species is briefly characterized on p. 349 of Class. Col. N. Am. (2d ed.) The last abdominal segment is also black, and is broadly foveate in the male. The elytra in that sex are deeply impressed, crumpled and nicked at the edge about one-fifth the length from the apex.

AGELASTICA Redt.

A. bicolor.—Bright ferruginous, shining. Head, smooth, with a fine transverse line and two flattened elevations between the eyes; in front of these is a deep angulated line, the clypeus is foveate. Prothorax twice as wide as long, smooth, convex, finely margined and rounded at the sides. Elytra broad, convex, finely punctulate, shining black. Antennæ fuscous, base testaceous. Length 5.5 mm.

One specimen given me by Mr. Bolter, as found at Fort Yuma, Ariz. Very robust and inflated in form, like the European species. The last ventral is marked with a large deep circular impression.

GALERUCA Oliv.

G. erosa.—Dull yellow, finely pubescent. Head strongly densely punctured, prothorax cribrate. Elytra finely very densely punctured; outer joints of antennæ and the tarsi fuscous. Length 8 mm.

Digitized by Google

Utah; quite different from our other species by the coarsely sculptured thorax, which has also four shallow discoidal impressions. The third joint of the antennæ is a little longer than the fourth, whereby it differs from Trirhabda, which it greatly resembles in form.

HYPOLAMPSIS Clark.

H. guttatus.—Fuscous, densely clothed with fine short pubescence, legs and elytra paler, the latter are twice as wide as the prothorax, impressed behind the base; striæ well impressed finely punctured, each with three dark spots, the first and third near the suture. Prothorax a little wider than long, alutaceous. Length 2 mm.

Louisiana, Mr. A. C. Reisig; easily distinguished from H. Mellyi by the wider, spotted elytra.

CAEPORIS Clark.

C. nanula.—Greenish or bluish, bronzed. Antennæ and legs fusco-testaceous, the former with a very deep transverse impression near the base, the latter finely but strongly punctured. Length 1-5 mm.

South Carolina, Zimmermann; Texas, Schwarz. To this genus is also referable Haltica Burgessi Crotch. They resemble, in miniature, Haltica (Graptodera).

DIRCÆA Muls.

D. Riversi.—Cuneiform, less arched than usual, piceous, very finely and densely punctulate, finely inconspicuously pubescent. Head convex, not impressed. Prothorax as long as wide, narrowed almost from the base to the apex, which is only half as wide as the base; sides not strongly rounded, hind angles rectangular not sharply defined, base scarcely sinuate, feebly depressed transversely in front of the base. Elytra not striate, with faint traces of two or three obsolete elevated lines. Beneath colored and punctured as above; last joint as long as the two preceding, but not much wider; third antennal joint as long as the two preceding, slightly shorter than the fourth. Length 11 mm.

Collected at Sylvania, Sonoma Co., Cala., by Messrs. Rivers and Ricksecker, in a decayed Madrone stump. This is the first appearance of the group Dircaeae on our Pacific slope.

ACRISIUS Desbr.

On further examination of the insect which I referred to this genus (Class. Col. 473), it seems to be distinct by the 3d and 4th ventral segments being of usual length. I cannot say at present to what genus it should be placed.

PACHYLOBIUS Lec.

P. picivorus Germ. A typical specimen from the Dejeanian collection kindly sent me by Mr. Roelofs shows that *Hylobius stupidus* Boh. is the same species.

Digitized by Google

HYLOBIUS Sch.

A typical specimen from Mr. Roelofs of *H. assimilis* proves it to be not distinct from *H. pales* Herbst.

ERODISCUS Sch.

E. tinamus.—Shining black, with a few long erect white hairs. Head smooth, beak extending to the third ventral segment. Prothorax uniformly deeply and sparsely punctured, very convex in front, tubularly constricted at the base. Elytra very convex, elongate-oval, not wider than the prothorax, with rows of deep, distant punctures; tip rounded; thighs armed with a small tooth. Length 4–6 mm.

Florida, Mr. H. G. Hubbard; two specimens.

CHALCODERMUS Sch.

C. spinifer Boh. Specimens of this species collected in Arizona by Mr. Morrison have on each elytron two rather large spots of pale pubescence and the prothorax is somewhat more finely punctured than in the one found in Florida by Mr. Hubbard.

ACALLES Sch.

A. costifer.—Black, covered with black appressed scales and very short bristles. Prothorax as long as wide, strongly punctured, finely carinate, rounded on the sides, bisinuate at base, hind angles nearly rectangular, disc with four small dots of white pubescence placed transversely at the middle, and one at the base near the scutel. Elytra elongate-oval, humeri well defined, striæ composed as usual of quadrate punctures, 5th interspace elevated from behind the base to about one-sixth from the tip; sides slightly rounded, sinuate near the tip and more rapidly narrowed; a few white dots are seen in the posterior third, and are more numerous in the middle third, where they form a diffused irregular transverse band. Length 4–5 mm.

Columbus, Texas; one specimen; Mr. Schwarz. Allied to A. carinatus, but quite distinct by the narrower form; elytra not wider than thorax, and the 5th interspace strongly elevated suddenly dropping at one-fifth from the tip; also by the outline of the elytra, which is more gradually oblique and more sinuate behind the middle.

A. sulcicollis.—Very small, elongate, black, clothed with thick dark-brown scales, with rows of short pale bristles on the elytra. Prothorax wider than long, rounded on the sides, disc clathrate with very large punctures, with three narrow dorsal ridges and well defined grooves which limit them. Elytra not wider than thorax, elongate-oval regularly rounded on the sides, humeri obtuse; a narrow transverse band of pale scales is seen at the 2d third of the elytra, and the general surface is slightly clouded with brown. Length 2 mm.

Columbus, Texas; one specimen, Mr. Schwarz. Similar in appearance to A. longulus, but easily distinguished by the peculiar sculpture of the prothorax.

Digitized by Google

PSEUDOMUS Sch.

P. inflatus.—Broadly oval, convex, narrowed at each end, with a thin covering of brown sub-metallic prostrate scales, which are denser, forming a lunate transverse spot behind the middle of the elytra. Head punctured, beak rugose and punctured at base, nearly smooth at tip. Prothorax equally strongly punctured above and beneath, without dorsal line. Elytra with striæ composed of approximate quadrate punctures. Legs strongly punctured, thinly squamose, front thighs acutely toothed, hinder ones with a very obtuse angle. Length 4 mm.

Cape Jupiter, Fla.; one pair, Mr. Hubbard. Easily recognized by the inflated form and nearly uniform color. The claws are connate nearly to the tip.

CRYPTORHYNCHUS Ill.

C. lutosus.—Oblong, black, clothed with depressed dirt-colored scales and a few short stout bristles intermixed. Prothorax a little longer than wide, not carinate, sides parallel behind the middle, then obliquely rounded to the apex, near which there is a slight constriction, disc prolonged above, post-ocular moderate. Elytra one-half wider than the thorax at base, sides parallel rounded behind, striæ composed of large distant punctures, interspaces flat. humeri obtuse, prominent, with an intra-humeral impression, ante-apical elevation distinct, apex concave; thighs armed with an acute tooth. Length 6 mm.

Cape Jupiter, Fla.; Mr. Hubbard, one specimen. Quite distinct from all others in our fauna; to be placed after C. obliquus Say.

C. brachialis.—Oblong-oval, black, clothed with white and ochreous depressed scales with nebulæ of dark brown, of which only a scutellar spot is distinctly defined; there are no intermixed bristles. Prothorax not wider than long, not carinate, sides rounded behind, then oblique to the apex, near which they are strongly constricted. Elytra but little wider than the thorax at base, humeri well defined, sides parallel, rounded behind; striæ composed of large quadrate punctures; the five outer interspaces are narrow and acutely elevated. Legs long and slender, thighs armed with one tooth; front thighs of male extending much beyond the head. Length 4.5–8 mm.

Columbus, Texas; found abundantly on Black Gum twigs.

LEMBODES Sch.

L solitarius Boh. Sch. Curc. VIII, i, 437. A specimen which agrees fully with the description was collected at Cape Jupiter, Fla., and kindly given me by Mr. Hubbard.

ZYGOPS Sch.

Z. semiuiveus.—Black, base of beak, sides of prothorax, mottlings of elytra and whole under surface clothed with white scales; flanks of prothorax and last ventral segment with a black spot each side; pygidium white with a transverse black band. Prothorax narrowed and feebly rounded on the sides from the base forwards transversely impressed near the apex, densely punctured, finely carinate; scutel transverse trapezoidal, truncate behind, where it is widest. Elytra with punctured striæ, the inner ones being finer, 5th interspace convex, with a row

Digitized by Google

of small tubercles; the mottlings are a small spot at the side of the scutel, a short sutural line behind the scutel connected about the middle with a narrow irregular band, another narrow more interrupted band behind the middle, and numerous dots; legs in greater part covered with white scales, thighs toothed. Length 7-9 mm.

Arizona, not rare.

TACHYGONUS Sch.

T. tardipes Lec. A variety of this species with the elytra black and the inner half of the hind thighs testaceous was collected abundantly by Mr. Morrison in Arizona.

TOXOTROPIS Lec.

T. pusilla Lec. Specimens collected in Texas by Mr. Schwarz vary much in markings; one is black with an inverted T-formed white mark near the base of the elytra; others are as pubescent as Brachytarsus variegatus and not unlike it in appearance.

T. fasciatus.—Of the same size and form as the preceding, black densely clothed with cinereous pubescence. Elytra with a broad black transverse band. Antennæ, tibiæ and tarsi testaceous. Length 1-5 mm.

Columbus, Texas; Mr. Schwarz.

CHORAGUS Kirby.

C. niteus.—Oval, convex, shining piceous. Prothorax finely punctured. Elytra with the striæ fine, distinctly punctured. Length 1 mm.

Tyngsboro', Mass.; one specimen kindly given me by Mr. F. Blanchard. Quite different from the other three species in our fauna by the shining surface and smaller size.

XENORCHESTES Woll.

X. americanus Motsch. This singular insect has been found by Hubbard in Florida, and by Schwarz at Columbus, Texas.

Digitized by Google

A study of some genera of ELATERIDÆ.

BY GEORGE H. HORN, M. D.

While preparing the portion of Dr. LeConte's paper for publication relating to Elateridæ, my attention was drawn to the confusion existing in several genera from the scattered descriptions of the species, and the absence, in many cases, of comparisons between them. To supply the want which appeared to exist I have made the following studies:

Of the species described in the following pages my cabinet contains specimens carefully compared with the types described by Dr. LeConte, the new species being also in my cabinet. Notwithstanding the fact that many of them have been several times more or less fully described I have thought it well to repeat the descriptions in order that they might be better compared and so enable future discoveries to be more readily correlated with them.

HORISTONOTUS Cand.

This genus contains those species for a time enrolled in Cardiophorus in which the margin of the thorax is moderately well defined in the basal half, the edge being at the same time coincident with the suture which divides the dorsal from the pectoral region of the prothorax.

In the lists which have been published eight species are recorded as occurring in our fauna, in the following pages six new ones will be found described and one (*exoletus*) added which has been known only from South America.

The occurrence of species with simple claws in our fauna is here indicated for the first time, and three are recorded with the claws cleft at tip. All our species have the free angle of the coxal plate rounded. Some have the humeri so broadly rounded as to lead to the suspicion that they are apterous. One species (*pullatus*) is certainly apterous, and I have very little doubt that the same will be found of those with broadly rounded humeri as *inanus*, *basalis*, *transfugus*, *definitus* and *sufflatus*. From this fact some modification of the table of genera as given by Candéze (Elat. iii, p. 104) is required, and Coptostethus must be placed next to Cardiophorus, from which it should be directly distinguished.

Digitized by Google

The punctuation of the thorax varies greatly, as will be seen by reference to the following table, and as the general form is also quite diverse I cannot realize that peculiar generic facies of which some authors have written.

In the accompanying table three series are indicated in place of two defined by Candéze, the subordinate characters are sufficiently definite as to require no special explanation.

Claws simple.....SERIES **A.**
Claws dentate from the middle to base.....SERIES **B.**
Claws cleft at tip.....SERIES **C.**

SERIES **A.**

Black, thorax bicolored, punctuation very coarse..... **vulneratus.**
Uniformly brown or piceous, pubescence rather coarse, punctuation of thorax mixed..... **pullatus.**

SERIES **B.**

Thorax not conspicuously narrower at apex than at base, sides usually strongly arcuate, disc at middle wider than the base.....2.
Thorax narrower at apex than at base, sides feebly arcuate, base as broad as disc at middle.....7.
2.—Sub-opaque, thorax coarsely and roughly punctured, the sides feebly arcuate. Body not coarctate at base of elytra..... **densus.**
More or less shining, thorax with double punctuation. Body more or less coarctate at base of elytra.....3.
3.—Punctuation of thorax extremely fine, surface shining, scarcely at all pubescent; color uniform..... **inanus.**
Punctuation of thorax very distinct, surface more or less pubescent.....4.
4.—Elytra paler at base or with a large humeral spot.....5.
Body above uniform in color.....6.
5.—General color brownish, elytra regularly oval in form, with basal fourth paler **basalis.**
Piceous, thorax paler at base and apex; elytra gradually narrower to apex, each shoulder with an oval reddish spot..... **transfugus.**
6.—Punctuation of thorax close and conspicuous, the surface opaque, the coarse punctuation nearly as abundant in the basal region as in front; general color ferruginous..... **definitus.**
Punctuation of thorax not conspicuous, the coarse punctuation scarcely extending behind the middle; general color piceous..... **suffiatus.**
7.—Castaneous to pale brown, form robust..... **simplex.**
Piceous, elytra maculate, legs and antennæ pale..... **curiatus.**
Piceous, nearly black, form slender, legs and antennæ pale yellow.. **gracilis.**

SERIES **C.**

Elytral intervals sub-costiform near the tip.
Brown or piceous, thorax one-fourth longer than wide, punctuation double. **exoletus.**

Digitized by Google

Ferruginous, thorax barely longer than wide, punctuation fine, uniform.
Uhleri.

Elytral intervals flat at apex.
Thorax nearly square, punctuation intermixed but not very distinct.
mitis.

H. vulneratus n. sp.—Form moderately robust, black, somewhat shining, flanks of prothorax beneath and a variable extent of the upper side red. Antennæ black, feebly serrate, not extending beyond the hind angles of the thorax. Head coarsely and densely punctured, front triangularly impressed. Thorax as wide as long, narrower in front, sides moderately arcuate, base slightly narrower than the middle, hind angles not divergent, disc convex, slightly shining, sparsely pubescent, rather coarsely and closely punctate, the punctures becoming somewhat finer posteriorly, basal incisures very distant, median line slightly impressed posteriorly, color in great part red with a triangular black space extending from the apical margin of variable size, rarely covering the greater part of the disc. Elytra a little wider than the thorax at base, arcuately narrowing to the apex, rather deeply striate, striæ punctate, intervals convex closely punctulate, sparsely pubescent; prothorax finely and closely punctate; metasternum and abdomen densely punctulate with a few slightly larger punctures intermixed. Legs black, sparsely punctate. Tarsal claws simple. Length .20–.24 inch; 5–6 mm.

This is the only species in our fauna with the greater part of the body black, and is the first recorded instance of one with simple claws.

Occurs in Arizona (Morrison).

H. pullatus n. sp.—Form robust, piceous or brownish, sub-opaque, clothed with rather coarse grayish pubescence. Antennæ pale, not longer than the thorax, feebly serrate. Head densely punctate, front rather flat. Thorax as wide or slightly wider than long, apex very little narrower than the base, sides rather strongly arcuate, hind angles slightly divergent, disc strongly convex, basal sulci distinct but small, median line slightly impressed posteriorly, a vague depression behind the apical margin, surface densely punctulate with coarse punctures sparsely intermixed, and which become somewhat finer posteriorly. Elytra not wider than the thorax, oblong oval, humeri broadly rounded, deeply striate, striæ coarsely and closely punctate, intervals slightly convex, rather densely punctulate with a single row of coarser punctures intermixed. Body beneath densely punctulate, with coarse punctures intermixed, the flanks of the prothorax with coarse punctures. Legs testaceous or brownish, densely punctulate. Tarsal claws simple. Length .20–.22 inch; 5–5.5 mm.

Our most robust species, easily known by its color, coarse pubescence and simple claws.

Occurs in Arizona (Morrison).

H. densus Lec.—Brownish, feebly shining, sparsely clothed with short cinereous pubescence. Legs and antennæ rufo-testaceous. Antennæ slender, nearly as long as half the body. Head convex, coarsely and closely punctate. Thorax as long as wide, apex scarcely narrower than base, sides rather feebly arcuate, basal plicæ small, disc convex, coarsely, densely and rather roughly punctured, the punctures less dense and somewhat finer posteriorly. Elytra slightly wider

Digitized by Google

than the thorax, sides sub-parallel, arcuately narrowing at apical third, surface rather deeply striate, striæ coarsely punctate, intervals convex, somewhat rugose and with a row of relatively coarse punctures. Body beneath more shining than above, rather closely punctate with coarse and fine punctures intermixed, the coarse punctures of the abdomen not conspicuous, those of the sides of the prothorax beneath large and numerous. Claws rectangularly dentate from the middle to the base. Length .18–.25 inch; 4.5–6.5 mm.

The sides of the thorax are less conspicuously arcuate than in the others of the series in which I place it. The punctuation of the thorax is more nearly that of the species preceding, with simple claws.

On comparing the above description with that of Dr. LeConte (New Species, p. 83) there will be found a very great difference in the sculpture of the thorax; he describes it as "dense subtiliter punctato." Nothing less than a careful examination of two typical specimens would have convinced me that the description which I have given could possibly apply to his species.

One specimen from Lower California, kindly sent me by Mr. H. Ulke, the type in cab. LeConte.

H. inanus Lec.—Form moderately robust, piceous, rather shining, sparsely clothed with grayish pubescence, legs pale. Antennæ piceous, two basal joints paler. feebly serrate, extending beyond the hind angles of the thorax. Head convex, sparsely finely punctate. Thorax not longer than wide, apex very little narrower than base, sides strongly arcuate, hind angles not divergent, basal plicæ very small, disc convex, shining, punctuation extremely fine. Elytra not wider than the thorax, oblong oval, humeri broadly rounded, rather deeply striate, striæ moderately closely punctate, intervals feebly convex, very sparsely punctulate. Body beneath piceous, shining, punctuation moderately dense with coarse and fine punctures intermixed, sides of pronotum more coarsely, prosternum scarcely at all punctulate. Claws rectangularly dentate from the middle to the base. Length .16–.18 inch; 4–4.5 mm.

The two specimens before me vary in color, one of them being entirely piceous the other somewhat brown from immaturity. In form it resembles *basalis*, but the two may be distinguished by the different thoracic punctuation even when they resemble each other by immaturity.

Two specimens; Sacramento Valley, Cal.

H. basalis n. sp.—Form moderately robust, piceous or brownish, sparsely fulvo-pubescent, elytra at base, antennæ and legs rufo-testaceous. Antennæ slender feebly serrate, extending slightly beyond the hind angles of the thorax. Head convex, densely unequally punctate. Thorax as wide as long, apex not narrower than the base, sides strongly arcuate, hind angles slightly divergent, basal plicæ very feeble, disc convex, moderately shining, densely unequally punctate. Elytra oblong oval, twice as long as the thorax, humeri broadly rounded, finely striate, striæ not closely punctate, the punctures much finer near the apex, intervals flat, extremely finely punctate. Body beneath densely punctulate with coarser punctures sparsely intermixed. Claws dentate from the middle to the base, the free angle rounded. Length .16–.20 inch; 4–5 mm.

Digitized by Google

The pale color occupies one-fourth to one-third of the base of the elytra, extending downward on the sides nearly to the middle. Varieties occur with the elytra entirely pale or even entirely piceous, in which case they resemble *inanus*, and may be distinguished by the thoracic punctuation.

Occurs in California; those in my cabinet are from Owen's Valley.

H. transfugus Lec.—Form moderately robust, piceous, sometimes nearly black, sparsely cinereo-pubescent, an oval humeral spot on the elytra, legs and antennæ rufo-testaceous. Antennæ extending beyond the hind angles of the thorax, feebly serrate. Head convex, moderately closely, finely punctate, with very few coarser punctures intermixed. Thorax a very little longer than wide, sides moderately arcuate, apex very little narrower than the base, hind angles slightly divergent, the basal plicæ small, but double, disc convex, moderately shining, finely and closely punctate, the coarser punctures barely distinct, color piceous, the apical and basal margins often reddish brown. Elytra not wider than the thorax, humeri distinct, gradually arcuately narrowing to apex, finely striate, striæ not deeply punctate, intervals flat, minutely and sparsely punctulate, humeral red spot oval acute behind, sometimes extending in a vitta. Body beneath very finely punctulate, coarser punctures evident only on the sides of the pronotum. Claws broadly toothed from middle to base. Length .18–.26 inch; 4.5–6.5 mm.

This species could only be confounded with *basalis*, from which it differs by its well defined elytral humeri, and the oval spot on each separated at the suture and not extending down on the sides.

Occurs in California (Sacramento Valley and northward).

H. definitus Horn.—Form robust, ferruginous or pale brown, sub-opaque, sparsely clothed with fine cinereous pubescence, somewhat holosericeous on the thorax, legs and antennæ paler. Antennæ slender, extending beyond the hind angles of the thorax. Head convex, densely punctulate with numerous coarse punctures intermixed. Thorax a very little longer than wide, sides moderately arcuate, apex scarcely narrower than base, hind angles not divergent, basal plicæ well marked, disc convex, fine punctuation scarcely evident, the coarse punctuation large and closely placed at middle in front, becoming gradually finer toward the base and sides. Elytra not wider than the thorax, oblong oval, humeri distinct, disc striate, striæ moderately coarsely but not closely punctate, intervals slightly convex, sparsely punctulate. Body beneath more closely pubescent than above, fine punctuation close with very evident coarser punctures intermixed. Claws rectangularly toothed from middle to base. Length .20–.28 inch; 5–7 mm.

Easily known among the species with the strongly arcuate sides of the thorax, by its color, the character of the thoracic pubescence, and the very evident coarse punctuation.

Occurs in Owen's Valley, California.

H. sufflatus Lec.—Form moderately robust, slightly depressed, piceous or brownish, shining, sparsely cinerso-pubescent, legs and antennæ testaceous. Antennæ slender, extending slightly beyond the hind angles of the thorax. Head

Digitized by Google

convex, finely punctulate with conspicuous coarser punctures intermixed. Thorax slightly longer than wide, apex and base nearly equal, sides strongly arcuate, hind angles slightly divergent, basal plicæ small, disc convex, closely finely punctulate with coarse punctures very regularly intermixed and nearly as distinct in the basal region as in front. Elytra a little wider at middle than the thorax, oblong oval, humeri broadly rounded, striate, striæ not closely punctured, intervals flat, sparsely punctulate. Body beneath finely closely punctulate, with coarse punctures intermixed, those of the sides of the prothorax longer. Claws rectangularly toothed from the middle to base. Length .20–.24 inch; 5–6 mm.

In the males of this species the thorax is nearly as wide as long. It is not easy to separate this species from the entirely piceous varieties of *inanus*, except by the very much more distinct punctuation of the thorax.

Occurs in California and western Nevada.

H. simplex Lec.—Form moderately robust, piceous, brownish or castaneous, moderately shining, very sparsely clothed with short yellowish pubescence with a few larger sub-erect hairs. Antennæ rufo-testaceous, very little longer than the head and thorax, feebly serrate. Head convex, densely punctulate with coarser punctures intermixed. Thorax not longer than wide, narrower in front, sides moderately arcuate, hind angles not divergent, basal striæ not conspicuous, disc moderately convex, densely finely punctulate with coarser (but not large) punctures intermixed, which become much finer posteriorly. Elytra very little wider than the thorax, arcuately narrower to apex, humeri distinct, disc moderately striate, the striæ with coarse closely placed punctures which become finer posteriorly, intervals slightly convex, densely finely punctulate with a single series of coarser punctures. Body beneath more shining than above, densely finely punctulate with coarser punctures intermixed. Legs pale, finely punctulate. Tarsal claws rectangularly dentate from the middle to the base. Length .24–.34 inch; 6–8.5 mm.

This species was originally described as black, but the color term is too strong. The form is that of *curiatus*, but longer. The thorax varies here in form as also in the other species; in some the sides are distinctly arcuate, in others nearly straight except in front, the form never approaches that seen in *transfugus*, etc.

Occurs in the Peninsula of California, at Fort Yuma, in Arizona, extending to southwestern Utah.

H. curiatus Say.—Piceous feebly shining, sparsely fulvo-pubescent, elytra at basal third and elongate apical spot, legs and antennæ rufo-testaceous. Antennæ slender, feebly serrate, very little longer than the thorax. Head convex, moderately shining, sparsely punctate. Thorax a little longer than wide, narrower in front, sides feebly arcuate, basal plicæ small and double, disc convex moderately shining, sparsely punctate. Elytra not wider at base than the thorax, slightly wider behind the humeri, then arcuately narrowing to apex, deeply striate, striæ punctate, intervals convex, sparsely punctulate. Body beneath piceous, shining, sparsely pubescent, the punctures rather fine not closely placed, coarser at the sides of prothorax. Legs pale, finely punctate and pubescent. Claws rectangularly dentate from the middle to the base. Length .15–.18 inch; 4–4.5 mm.

Digitized by Google

The yellow color at the base of the elytra occupies usually a little more than a third of their extent; specimens sometimes occur with the elytra almost entirely yellow. The thoracic sculpture consists almost entirely of the punctures which are usually the coarse ones of the other species, they are, however, rather fine, while the usual fine punctures are almost entirely absent.

Widely diffused in the eastern region as far as Texas.

H. gracilis n. sp.—Form rather slender, piceous, moderately shining, very sparsely fulvo-pubescent, legs and antennæ rufo-testaceous. Antennæ slender feebly serrate, extending slightly beyond the hind angles of the thorax. Head convex, moderately shining, front slightly flattened, punctuation intermixed but not close. Thorax longer than wide, narrower at apex, sides arcuate in front, slightly sinuate before the hind angles, basal plicæ distinct but short, disc convex, shining, rather densely and very finely punctulate with not very conspicuous coarser punctures intermixed. Elytra not wider than the thorax and about twice as long, arcuately narrower to apex, striate, striæ rather closely punctate, intervals feebly convex, very sparsely punctulate. Body beneath shining, finely closely punctate, the intermixed coarser punctures very evident on the flanks of the prothorax but not on the abdomen. Claws rectangularly dentate from the middle to the base. Length .24 inch; 6 mm.

This is one of the most slender species in our fauna. The form of the thorax is somewhat intermediate between the two preceding species and those which follow; the base, however, is as broad as the widest part a little in front of middle.

Occurs in western Nevada.

H. exoletus Erichs.—Form slender, brown or nearly piceous, sparsely and finely cinereo-pubescent, moderately shining, antennæ and legs testaceous. Antennæ slender, extending slightly beyond the hind angles of the thorax. Head convex, closely punctate, the coarser punctures conspicuous. Thorax one-fourth longer than wide, apex narrower than base, sides moderately arcuate, hind angles not divergent, basal plicæ distinct but not large, disc convex, moderately closely punctulate with not conspicuously coarser punctures intermixed. Elytra not wider than the thorax, humeri distinct, sides gradually arcuately narrowing from the humeri to the apex, surface rather deeply striate, striæ coarsely punctate, intervals convex in their entire extent, 2-3-5-7-9 at apex more elevated and costiform, their surface obsoletely punctulate with coarser punctures intermixed, the latter not conspicuous on the abdomen. Claws cleft at tip. Length .22–.28 inch; 5.5–7 mm.

This species is rather more slender and the thorax longer than in *Uhlerii*, and with an intermixed punctuation. The color of the two is also different. In admitting this species as an inhabitant of our fauna the determination has been made by very careful comparison of my specimens with a type sent me some years ago by Dr. Candéze. I have seen but two specimens, both smaller (1 mm.) than the South American specimens.

Occurs in southwestern Texas.

Digitized by Google

H. Uhlerii Horn.—Form rather slender, rufo-testaceous, moderately shining, sparsely clothed with short yellowish hairs. Antennæ slender, half the length of the body. Head convex, rather coarsely and closely punctured in front. Thorax longer than wide, apex distinctly narrower than base, sides moderately arcuate, hind angles not divergent, basal plicæ small but distinct, disc convex, punctuation fine, not dense and uniform in degree. Elytra as wide at base as the thorax, humeri distinct, sides gradually narrowing from the humeri to the apex, moderately deeply striate, striæ coarsely punctured, intervals slightly convex at base, near apex costiform, the intervals 2–3–5–7–9 entire and more elevated, the surface sparsely punctulate with a single series on each of somewhat larger punctures. Body beneath shining, not closely punctulate, the punctures intermixed but not conspicuously different. Claws cleft at tip, the tooth being very near the apex. Length .24 inch; 6 mm.

This species is related to a small group associated by Candéze in his synoptic table (Elat. iii, p. 246) consisting of *exoletus parmenoides*, *attenuatus* and *acutipennis*, all of which occur on the Pacific slope of South America. Of these *exoletus* is known to me by a type sent by Dr. Candéze in which I find the claws as stated above. There is, however, no mention of this character in any of the descriptions but which is so evident as to indicate the propriety of a division of the genus into three series instead of two. It is possible that some other species without costiform intervals should be included in this third series.

Occurs in Florida and Georgia.

H. mitis n. sp.—Pale rufo-testaceous, moderately shining, sparsely clothed with short cinereous pubescence. Antennæ slender, extending beyond the hind angles of the thorax. Head not closely punctate, vertex with a short longitudinal impression each side. Thorax scarcely longer than wide, apex scarcely narrower than base, sides feebly arcuate, disc convex, with very indistinct coarse and fine punctuation not closely placed, basal plicæ very small. Elytra slightly wider than the thorax, humeri distinct, sides gradually narrowing to base, disc striate, the striæ coarsely punctured, becoming rapidly finer to apex, intervals slightly convex at base, flat at apex, sparsely punctulate. Body beneath closely finely punctulate with coarse punctures intermixed, the punctuation finer on the abdomen than on the sides of the prothorax beneath. Claws cleft at tip. Length .24 inch; 6 mm.

Easily distinguished from either of the preceding species by its nearly square thorax and the flat interstices at apex.

One specimen, Utah.

HORISTONOTUS Cand.

H. vulneratus n. sp.
H. pullatus n. sp.
H. asperatus n. sp.
H. densus Lec. New Species 1863, p. 83.
H. inanus Lec. (*Card.*) Trans. Am. Phil. Soc. x, p. 499.
H. basalis n. sp.
H. transfugus Lec. (*Card.*) loc. cit. p. 500.
H. definitus Horn Trans. Am. Ent. Soc. 1871, p. 302.

Digitized by Google

H. sufflatus Lec. (*Card.*) loc. cit. p. 499.
H. simplex Lec. New Species 1863, p. 83.
H. curiatus Say (*Elater*) Trans. Am. Phil. Soc. vi, p. 173; Lec. loc .cit. p. 500; Cand. Elat. iii, p. 265.
areolatus Erichs. (*Card.*) Zeitschr. ii, p. 320.
H. gracilis n. sp.
H. exoletus Erichs (*Card.*) loc. cit. p. 325; Cand. loc. cit. p. 257.
H. Uhlerii Horn loc. cit. p. 302.
H. mitis n. sp.

ESTHESOPUS Esch.

To this genus belong those Cardiophori in which the side margin of the thorax is acute from the base nearly to the apex and the fourth tarsal joint dilated and somewhat lobed beneath.

In all the species the claws are similar to those of the second group of Horistonotus, that is they are squarely dentate from the middle to the base. The humeri are in all cases distinct, the sides of the elytra continuous with the sides of the thorax and not forming an entering angle as in many Horistonotus. The surface is finely and sparsely pubescent. The surface of the thorax has the same intermixed punctuation which is always fine and inconspicuous except in *praeditus*.

The following table will assist in the identification of our species, two only of which are really new, while two others have been long known but erroneously determined in the Check List:

Thorax with small but distinct basal plicæ.....**clavicollis.**
Thorax without basal plicæ.
Color uniform, ferruginous or piceous.
Coarser punctures of thorax larger and more numerous along the sides and base.....**præditus.**
Coarser punctures finer and less numerous at sides and base.
Uniformly brown.....**parcus.**
Ferruginous, more shining.
More robust, elytral intervals biserrately punctulate.....**dispersus.**
Sub-depressed, intervals with one series of punctures.....**pusio.**
Bicolored; body beneath, head and thorax reddish, elytra black....**bicolor.**

E. clavicollis Say.—Form moderately robust and shining, sparsely clothed with cinereous pubescence, piceous, antennæ and legs rufo-testaceous. Antennæ slender, extending slightly beyond the hind angles of the thorax. Head convex, punctuation rather dense and intermixed. Thorax a little longer than wide, narrower in front, sides nearly parallel posteriorly, arcuate anteriorly, hind angles not divergent, basal plicæ small but distinct, disc convex rather shining, punctuation close but very fine and intermixed, somewhat more distinct at the sides. Elytra not wider than the thorax, a little more than twice as long, humeri distinct, sides feebly arcuate, narrowing at apical third, surface striate, striæ rather coarsely and moderately closely punctate, intervals slightly convex, and indistinctly closely punctulate. Body beneath slightly paler than above, moderately closely punctate, the punctures intermixed. Length .28 inch; 7 mm.

Digitized by Google

By the presence of the basal plicæ this species is evidently related to *praecox*, but the latter has a different color and a broader thorax. In our own fauna it resembles very closely *praeditus*, as will be seen in the description of that species. A male loaned me by Mr. Ulke is more slender in form and the elytral intervals more convex.

This species was unknown to LeConte at the time of his Revision, and first appears as Esthesopus in the List of 1863.

Occurs from Virginia to Indiana and Texas.

E. praeditus n. sp.—Piceous, shining, form robust, sparsely clothed with short yellowish pubescence, antennæ and legs pale yellow. Antennæ slender, extending slightly beyond the hind angles of the thorax. Head convex, a slight vertical depression, punctuation double, the fine punctures nearly obsolete, the coarse punctures large and deep, but not densely placed. Thorax as wide or possibly a little wider than long, sides parallel posteriorly, arcuate at apical third, basal plicæ absent, disc convex, shining, with intermixed punctuation, the coarser punctures very much larger at the sides and near the base. Elytra behind the middle a little wider than the thorax, humeri distinct, sides feebly arcuate, surface rather deeply striate, striæ coarsely punctured, intervals convex in their entire extent, slightly rugulose and sparsely punctulate. Body beneath paler than above, the lobe of the prosternum ferruginous, the surface with intermixed punctuation, the finer punctures very indistinct, the coarser very well marked. Length .26 inch; 6.5 mm.

This insect resembles *claricollis* in appearance, but differs from that and all our other species by the unusually coarse punctures along the sides and base of the thorax.

From the characters given in the synoptic table by Candeze (vol. iii, p. 275) this species should be related to *hepaticus* and *murinus* from the following remarks: "Prothorax plus fortement ponctué á la base qu'au milieu du disque." In the description of *humilis* in comparing the latter with *hepaticus* he says: "Elle (*humilis*) en diffère par sa couleur, qui est d'un chatain rougeatre clair, et la punctuation du prothorax qui est constituée á la base et sur les parties lateralés, par de gros points." There is evidently some confusion in the table.

Occurs in Tennessee and Texas.

E. parcus n. sp.—Form moderately robust, piceous or brown, elytra always paler than the thorax, moderately shining, surface sparsely pubescent, antennæ and legs yellow. Antennæ slender, scarcely reaching the hind angles of the thorax. Head convex, punctuation close, intermixed, the fine punctuation barely evident. Thorax as broad as long, sides nearly parallel posteriorly, arcuate in front, disc convex, without basal plicæ, surface moderately closely punctate, punctures intermixed and very evenly disposed, the coarser punctures a little more distinct at middle near the apex. Elytra not wider than the thorax, parallel, narrowed at apical third, moderately deeply striate, striæ coarsely punctured, intervals convex.

Digitized by Google

rather sparsely punctulate. Body beneath more shining than above, moderately closely punctate, punctuation intermixed, the coarser punctures larger on the sides of the prothorax. Length .20–.26 inch; 5–6.5 mm.

For many years this species has been labeled in our cabinets *hepaticus* Cand., and is so recorded in the Check-List. From a letter written by Candeze (Aug. 25, 1871) I received the following note: "The Esthesopus you send seems to me distinct from *hepaticus* and allied described species. It is proportionally narrower, and its prothorax longer compared with its width." The last sentence gives the only characters, which seem not very great considering a very evident variability to a slight degree in the specimens before me. I have, however, adopted the view that it is distinct, from the fact that the synoptic table above quoted gives to *hepaticus* a style of thoracic punctuation similar to that described for *claricollis*. The facies of this species is very like the preceding two. The most striking difference between this and the following species is in color, the other differences will be alluded to under that species.

Collected by me at Camp Grant, Arizona.

E. dispersus n. sp.—Form moderately robust, reddish brown, moderately shining, sparsely clothed with short yellowish pubescence. Antennæ slender, slightly longer than the thorax. Head convex, coarsely not closely punctate, the finer punctures scarcely evident. Thorax as long as wide, sometimes a little longer, sides nearly parallel, slightly arcuate in front, disc convex, basal plicæ absent, surface moderately closely punctate, punctuation intermixed and exactly equal over the entire surface. Elytra a little wider behind the middle than the thorax, sides feebly arcuate, surface moderately deeply striate, striæ rather coarsely punctured, intervals flat, slightly convex near the base, irregularly biserrately punctulate. Body beneath moderately densely punctate, punctures intermixed, denser on the abdomen, coarser on the sides of the pronotum. Length .22–.26 inch; 5.5–6.5 mm.

Differs from the preceding species primarily in color. The antennæ are a little longer, the elytra intervals flatter and the thoracic punctuation much more nearly equal. This species is the *humilis* of the Check-List, but of this species Candeze states that the thorax is "dupliciter punctato; basi lateribusque punctis majoribus adsperso," as described above for *claricollis*.

Occurs in Texas, Utah, Arizona and southern California.

E. pusio n. sp.—Rufo-testaceous, sub-depressed, moderately shining, very sparsely pubescent. Antennæ slender. Head convex, punctuation not dense, the fine punctures not evident. Thorax a little wider than long, narrowed in front, sides parallel at posterior third, arcuate in front, disc moderately convex, punctuation intermixed, equally disposed, the coarser punctures numerous but not large, the finer punctures scarcely evident. Elytra a little wider behind the mid-

Digitized by Google

dle than the thorax, humeri distinct, sides feebly arcuate, surface striate, striæ moderately coarsely punctured, intervals flat, slightly wrinkled with a single series of fine punctures. Body beneath with rather close intermixed punctuation, the coarser punctures at the sides of the prothorax unusually coarse. Length .14 inch; 3.5 mm.

The antennæ in the unique before me are in part wanting, but from the slender aspect of those present the entire number would extend beyond the hind angles of the thorax.

A smaller and more depressed species than any in our fauna. It could only be confounded with *dispersus* by description, but is relatively broader and more depressed, elytral intervals flatter and uniseriately punctulate.

One specimen, Florida.

E. bicolor Horn.—Form moderately robust, sparsely finely pubescent, shining, body beneath red, becoming piceous posteriorly. head and thorax red, elytra black, antennæ and legs rufo-testaceous. Antennæ slender, not extending beyond the hind angles of the thorax. Head sparsely, intermixed punctate, vertex with vague depression. Thorax slightly longer than wide, sides straight and nearly parallel behind, anterior third arcuately narrowing, disc convex, shining, sparsely punctate, the punctures intermixed. Elytra very little wider than the thorax, humeri distinct, sides feebly arcuate, disc rather deeply striate, striæ punctured, intervals convex in their entire length, slightly rugulose and sparsely punctate. Body beneath with intermixed punctuation, not closely placed, the finer punctuation scarcely distinct. Length .20 inch; 5 mm.

A very distinct species by its color and deep elytral striation.

Two specimens are known to me. That in my collection was given me by Edward Tatnall, and said to have been collected in Delaware, where he lived. As he made a journey to Florida there may be some doubt, inasmuch as a specimen is in LeConte's cabinet collected by Hubbard and Schwarz in Florida.

ESTHESOPUS Esch.

E. claricollis Say, Trans. Am. Philos. Soc. vi, p. 169; Lec. List, 1863, p. 45.
E. praeditus n. sp.
E. parcus n. sp., *hepaticus*. Check-List.
E. dispersus n. sp., *humilis*. Check-List.
E. pusio n. sp.
E. bicolor Horn, Trans. Am. Ent. Soc. 1874, p. 22.

APTOPUS Esch.

A. peregrinus n. sp.—Form of *Cardiophorus convexus*, rufo-testaceous, brown or piceous, moderately shining, sparsely pubescent. Antennæ as long as half the body, feebly serrate. Head closely, rather coarsely punctate, front arcuate. Thorax longer than wide, base slightly wider than apex hind angles feebly divergent, sides very feebly arcuate, lateral margin without acute edge, hind angles with

Digitized by Google

a short carina, disc moderately convex, closely punctate, basal incisures short, feeble, median line impressed posteriorly. Elytra wider than the thorax, arcuately narrowing to apex, deeply striate, striæ moderately coarsely and closely punctate, intervals convex, sparsely punctate. Body beneath densely finely punctate, less shining than above. Length .22–.30 inch; 5.5–7.5 mm.

This species belongs to the first section of the genus as characterized by Candeze, having the sides of thorax without acute margin. It seems most closely related to *spadiceus*, but the thorax is distinctly longer than wide.

Occurs in Dimmit County, Texas; several specimens.

The genus Aptopus resembles Cardiophorus in all respects except that the tarsal claws are pectinate as in Melanotus. The species already known are few in number and occur in Mexico and Brazil.

LUDIUS Latr.

The genus as here recognized contains the same elements as in the monograph of Candeze less *limbalis*, which Dr. LeConte has properly removed to Megapenthes, and *tartareus*, at one time placed in Ludius, which has also been placed in the same genus.

The antennæ are very uniform in construction, the second and third joints are always small, the third a little longer than the second, the two together shorter than the fourth. The fourth joint usually longer than any of the following joints. The terminal joint is always suddenly narrower near the apex presenting the appearance of a false joint.

The females have shorter antennæ than the male, the joints from 4–11 being shorter, although as wide as in the male, have the appearance of being more strongly serrate.

The form of the free angle of the hind coxal plate varies in the species. In some the angle is quite acute in others obtuse or rounded, the transition is, however, so gradual that no use can be made of it systematically.

Two Californian species are remarkable in having the entire lateral margin of the thorax visible from above, in all the other species it is deflexed.

The structure of the mesosternal fossa in *attenuatus* is unique in our fauna, and it is remarkable that the only other species with similar structure occur in intertropical Asia.

The following table will enable our species to be separated with ease. In their distribution, three belong to the Pacific region, two to the

Digitized by Google

Atlantic region proper, while the two brown species extend—the one from Florida to Texas, the other from Texas to Cape San Lucas.

Mesosternal fossa with parallel sides.
Elytra sub-striate..... **attenuatus.**
Mesosternal fossa with sides strongly convergent behind.
Species totally black.
Elytra with punctures arranged in distinct striæ; side margin of thorax entirely visible from above..... **LeContei.**
Elytra with rather dense confused punctuation.
Thorax opaque, densely punctured.
Thoracic margin entirely visible from above; elytra without trace of striæ; punctuation of thorax coarse; form elongate..... **ater.**
Thoracic margin deflexed in front; elytra sub-striate; punctuation of thorax finer and denser; form robust..... **pinguis.**
Thorax shining, punctuation not dense.
Thoracic margin deflexed in front; elytra sub-striate; form moderately robust..... **abruptus.**
Species brown or ferruginous with punctato-striate elytra.
Thorax as wide or wider than long; pubescence recumbent... **texanus.**
Thorax longer than wide; pubescence semi-erect..... **hepaticus.**

L. attenuatus Say.—Form moderately robust, gradually narrower posteriorly, feebly shining, reddish brown, elytra darker toward the apex, sometimes totally black, clothed with very fine sericeous pubescence. Antennæ piceous, serrate, attaining the hind angles of thorax in male, shorter in female. Head piceous, convex, moderately coarsely, not closely punctate. Thorax as long as wide or longer in the male, sides gradually narrowing from base to apex, feebly arcuate, lateral margin invisible from above in front, hind angles produced, strongly carinate, disc convex, a median depression posteriorly, coarsely not densely punctate. Elytra not wider than the thorax, rapidly narrowing to apex, and dehiscent for a short distance, the tips acute, surface sub-striate, densely sub-muricate punctate. Flanks of prothorax densely punctate, prosternum more shining and more sparsely punctate. Abdomen not densely punctate. Length .72–.88 inch; 18–22 mm.

In well preserved specimens the body beneath and thorax above are distinctly iridescent. The sides of the mesosternal cavity are moderately elevated and parallel, in this respect this species differs from all the others in our fauna.

Widely distributed over the territory from the Rocky Mountains to the Atlantic and as far South as Texas.

L. LeContei Horn.—Form elongate, black, moderately shining, very sparsely clothed with short black pubescence. Antennæ serrate, slightly passing the hind angles of the thorax in female, one-third longer in male. Head feebly convex, coarsely not closely punctate. Thorax longer than wide in both sexes, sides slightly arcuate in front, straight and divergent posteriorly, hind angles prolonged, carinate, lateral margin entirely visible from above, disc moderately convex, a distinct depression at middle posteriorly, coarsely not densely punctate. Elytra a little wider than the thorax, a little more than three times as long, sides scarcely

Digitized by Google

arcuate, rapidly narrowing posteriorly, apices slightly sinuate, the sutural angle slightly prolonged; surface with distinct rows of moderately coarse punctures, somewhat confused near the base, the interspaces with a single irregular series of finer punctures. Prothorax beneath coarsely not closely punctured, the prosternum more coarsely punctured than the flanks. Abdomen sparsely punctured. Length .72–.98 inch; 18-24.5 mm.

This species is the most slender in form in our fauna and the only one in which the punctures of the elytra are arranged in rows. The lateral margin of the thorax is entirely visible from above, a character otherwise known only in *ater*.

Occurs in California, at San Diego, Tejon and Santa Barbara.

L. ater Cand.—Moderately elongate, black and shining, sparsely clothed with short black pubescence. Antennæ as in *LeContei*. Head feebly convex very coarsely and closely punctate. Thorax longer than wide sides gradually narrowing from base to apex, very slightly arcuate, margin visible from above hind angles prolonged, strongly carinate, disc opaque, moderately convex, coarsely and deeply punctured, the punctured less dense near the middle of the base. Elytra not wider than the thorax, gradually and feebly arcuately narrowing to apex, the tips rounded, sutural angle distinct but not prolonged, disc rather closely and roughly punctured without trace of strial arrangement. Flanks of prothorax rather densely coarsely punctured, the prosternum more coarsely, deeply and less densely. Abdomen sparsely punctured. Length .72 –.96 inch; 18–24 mm.

This is also a large species, and resembles *LeContei* somewhat but is less slender, with more coarsely punctured thorax and differently sculptured elytra.

Occurs at Santa Barbara, California.

L. pinguis n. sp. Form robust, black, shining, clothed with fine, black, silken pubescence. Antennæ serrate, not reaching the hind angles of the thorax in the female (male?). Head densely punctate. Thorax wider than long, sides gradually, arcuately narrowing to the front, hind angles slightly divergent, strongly carinate disc convex, densely, not coarsely punctate. Elytra slightly wider behind the middle than the thorax, and about two and a half times as long, sides slightly arcuate, apices conjointly rounded, sutural angle not prominent, surface obsoletely sub-striate, densely punctate, the punctures finer than on the thorax, more shining than the thorax. Body beneath densely punctate, the flanks of the prothorax beneath more opaque and more coarsely punctured, the prosternum more coarsely punctured and more shining. Length .83 inch; 21 mm.

In our series of species the above bears the closest resemblance to *abruptus* from which it differs in its much more robust form and the densely punctured thorax. The only other species with which it might be confounded in description is *ater* which is more elongate in form and with quite coarse punctuation of the thorax.

Occurs near Portland, Oregon.

Digitized by Google

L. abruptus Say.—Form moderately robust, male more slender black, shining, clothed with fine black sericeous pubescence. Antennæ serrate, attaining the tips of the hind angles of the thorax in the male, shorter in the female. Head convex, coarsely not closely punctate. Thorax as wide as long in the female, somewhat narrower in the male, sides arcuately narrowing to the front, lateral margin not visible from above in front, hind angles not divergent, carinate, disc convex, shining, rather coarsely not closely punctate. Elytra not wider than the thorax, sides gradually arcuately narrowing to apex, the tips conjointly rounded, sutural angle not prominent, surface sub-striate, rather densely sub-muricately punctured. Body beneath shining, the punctuation similar to that of the thorax above. Length .62–.80 inch; 15.5–20 mm.

Although not a common species, it is represented in nearly all collections, and is sufficiently well known. The characters in the table give, in a summary manner, the differences between this and our other black species.

Occurs in Middle, Southern and Western States.

L. texanus Lec.—Form moderately robust, brownish castaneous, moderately shining, moderately densely clothed with short, yellowish brown, recumbent pubescence. Antennæ longer than the thorax in the male, shorter in the female. Head coarsely and moderately closely punctate. Thorax as wide at base as long, a little narrower in the male than in the female, sides straight at posterior two-thirds, arcuate, in front, gradually narrower from base to apex, lateral margin not visible from above in its anterior extent, hind angles slightly divergent, carinate, disc convex, coarsely and moderately closely punctate. Elytra not wider than the thorax gradually arcuately narrowing to apex, the tips conjointly rounded, sutural angle not prominent, disc finely striate, striæ coarsely not closely punctate, intervals flat, densely sub-muricately punctured in the male, more sparsely punctate in the female. Flanks of prothorax beneath coarsely punctured and sub-opaque, prosternum more coarsely and sparsely punctate. Abdomen sparsely punctate, quite finely at middle, more coarsely at the sides. Length .62–.80 inch; 15.5–20 mm.

The differences in elytral sculpture between the sexes are well marked; it will, however, be observed that the Cape San Lucas specimens are, sex by sex, less punctate than those from Texas.

Occurs from Texas to Cape San Lucas.

L. hepaticus Germ.—Form moderately robust, male usually more slender, brownish castaneous or ferruginous, moderately densely clothed with semi-erect yellowish brown pubescence. Antennæ serrate, in both sexes extending beyond the hind angles of the thorax, longer in the male. Head coarsely moderately closely punctate. Thorax distinctly longer than wide and narrower in the male than in the female, sides nearly straight and convergent at posterior two-thirds, arcuate in front, lateral margin not visible from above except near the hind angles, these not divergent, strongly carinate, disc convex, coarsely not densely punctured. Elytra not wider than the thorax, gradually arcuately narrower to apex, tips conjointly rounded, sutural angle not prominent, disc finely striate, striæ rather coarsely not closely punctate, intervals flat, moderately closely sub-muricately punctured in the male, more sparsely in the female. Body punctured beneath as in *texanus*. Length .62–.70 inch; 15.5–17.5 mm.

Digitized by Google

This and *texanus* closely resemble each other and differ in the form of the thorax and the character of the pubescence. The antennæ are longer in the present species, and in the female of this are as long as in the male of *texanus*.

Occurs from Florida to Texas.

LUDIUS Latr.

L. attenuatus Say, Trans. Am. Phil. Soc. vi, 1839, p. 166; Lec. Trans. Am. Phil. Soc. n. s., x, p. 455; Cand. Mon. iv, p. 298, pl. iv, fig. 6.
fuscus Cast. Hist. Nat. 1, p. 240.

L. LeContei Horn, Trans. Am. Ent. Soc. 1871, p. 313.

L. ater Cand., Mem. Belg. xvii, 1865, p. 55.

L. pinguis n. sp.

L. abruptus Say, Ann. Lyc. 1, p. 253; Lec. loc. cit. p. 455; Cand. loc. cit. p. 306
coracinus Germ. Zeitschr. iv, p. 47.

L. texanus Lec. loc. cit. p. 308.

L. hepaticus Germ. Ins. sp. n. p. 43; Lec. loc. cit. p. 453; Cand. loc. cit. p. 307

ANCHASTUS Lec.

A. frontalis n. sp.—Form elongate, pale chestnut-brown, moderately shining, clothed with fine fulvous pubescence. Antennæ extending beyond the hind angles of the thorax, feebly serrate, the second and third joints small, together barely as long as the fourth. Front honey-yellow, (accidental?) moderately coarsely not densely punctured. Thorax as long as wide at base, sides gradually, arcuately narrower to the apex, hind angles not divergent, bicarinate, the carinæ well elevated, the outer long and not very close to the margin, disc convex, surface moderately coarsely and closely punctured, the punctures coarser and closer at the sides. Elytra not wider than the thorax, parallel at basal two-thirds, then gradually narrowing to apex, surface with faint punctured striæ which become evanescent near the apex, the intervals very slightly convex near the base, rather closely punctulate. Body beneath more shining than above moderately closely punctate, the last ventral segment more finely punctate. Free angle of coxal plate rounded and more prolonged than the inner angle. Length .40 inch; 10 mm.

This species resembles *sericeus* in color but is more slender. As in the latter the second and third joints of the antennæ are small and together shorter than the fourth, a character otherwise unknown in our species. In *sericeus* the dilated portion of the coxal plate is truncate in the present species more prolonged and rounded. The color of the head may possibly be accidental in the only specimen I have seen and I therefore lay very little stress upon it.

One specimen Las Vegas, New Mexico, Prof. Snow.

A. militaris Cand.

This species is rather small, black, the elytral humeri with a large orange yellow spot. In my cabinet there is a specimen totally black without spot which in all other respects agrees with the typical form.

Western Nevada, Morrison.

Digitized by Google

A. bicolor Lec.

While on a visit to Mr. Ulke some months ago I had an opportunity for the first time to examine the type of the above species. By a comparison of specimens I am inclined to suppress *A. desertus* Horn as a mere color variety. Some of my specimens collected at Fort Yuma have the elytra decidedly brown but none are so dark as described by LeConte and shown in the type.

ISCHIODONTUS Cand.

An examination of the cabinet of Dr. LeConte showed that this genus had been under study. There were, however, no notes left and the arrangement of the specimens shows that he considered *simplex* Lec. and *oblitus* Cand. as synomyns of *soleatus* Say. In the synonymy he had also included *approximatus* Cand., but I am sure the determination of this species is incorrect, and it should for the present be stricken from our lists.

LEPTOSCHEMA n. g.

This name is suggested for an insect described by me as *Agriotes protractus* (Trans. Am. Ent. Soc. 1871, p. 317). A more careful study of this species, made necessary by a revision of Dr. LeConte's notes on Agriotes, convinces me that it belongs to the Athoites as defined by Candéze. The following are its characters:

Head deeply inserted, somewhat deflexed; front arcuate, the margin not prominent but very distinct. Antennæ slender feebly serrate, joints 2–3 small, equal together very little longer than the fourth, 4–11 nearly equal in length. Prothorax convex, the lateral margin entire, gradually deflexed in front, very nearly to the inferior margin of the eye. Scutellum oval. Elytra elongate, obtuse at tip. Prosternum distinctly lobed in front, the mucro slender and straight; lateral sutures nearly straight, double, feebly excavated in front. Mesosternum declivous, the margins of the fossa not prominent. Posterior coxæ rather narrow, very slightly wider internally, the inner angle very obtusely toothed. Legs slender, Tarsi slender and simple, joints 1–4 decreasing in length, the first joint nearly as long as the next two.

This genus is closely related to Limonius and Athous, and like many of the genera of the family is separated by feeble characters. With the first it agrees in having the prosternal sutures double, it differs in having the legs and tarsi more slender, the first joint, especially of the posterior tarsi, being much longer than the second. Athous has the the prosternal sutures single, at least in our species.

Digitized by Google

In studying Athous some time since I observed that the prosternal sutures are double in *discalceatus* and *bicolor*, and that the tarsi have the same structure as observed in *Agriotes protractus*. While considering the latter as the type of Leptoschema, it is suggested that the two Athous be placed in it for the present.

The species therefore are:

L. protractum Horn. Trans. Am. Ent. Soc. 1871, p. 317.
L. bicolor Lec. Trans. Am. Philos. Soc. x, p. 426.
L. discalceatum Say, Trans. Am. Phil. Soc. vi, p. 169; Lec. loc. cit. p. 427.

L. protractum Horn has great resemblance in form to the figure of *Psiloniscus borborurus*, given by Candéze, Elat. iii, pl. 1, fig. 2.

ENICONYX n. g.

Head inserted as far as the eyes which are moderately large and prominent; front margined with semi-circular outline; labrum moderate, apex arcuate; mandibles prominent, acute at tip, dentate within the apex; maxillary palpi not long, the terminal joint flattened, broader at tip and obliquely truncate. Antennæ slender half the length of the body, eleven-jointed, very feebly serrate, joints 2-3 each shorter than the fourth. Lateral margin of thorax obtuse, the suture between the pronotum and flanks inferior, hind angles slightly divergent; prosternum broad, the sutures distant, diverging to the front, fine, not excavated, prosternum arcuate at tip not acutely prolonged. Middle coxæ moderately separated, the mesosternum oblique, excavated. Posterior coxal plates very narrow externally, rapidly wider within, the inner angle somewhat prolonged but obtuse. Legs slender, tibial spurs distinct but small; tarsi slender, about three-fourths as long as the tibiæ, joints 1–4 gradually decreasing in length; claws moderate in length, pectinate. Scutellum cordiform, impressed.

The characters above apply to a genus belonging to the tribe Plastocerini of the Elateridæ which is related most closely to Aphricus. The present genus possesses nearly all the characters of Aphricus except that the mandibles a little less prominent, while it presents the very rare character of pectinate claws.

The discovery of this genus indicates a closer relationship between Aphricus and the Cardiophori than has been suspected. They all have the same cordiform scutellum and similar posterior coxal plates, that is, narrow externally and abruptly dilated within. In the Cardiophori the the margin of the front is much elevated above the base of the labrum in Aphricus very nearly on the same level, and in Eniconyx intermediate in structure. The mandibles are prominent in Aphricus with a wide space enclosed by them; in Eniconyx the mandibles are prominent, but there is no space beyond the labrum, while in the Cardiophori the mandibles do not project beyond the end of the prosternal lobe.

Digitized by Google

The remarks concerning the Cardiophori are made in special reference to Aptopus, a species of which has occured in our fauna.

The claws in Aptopus are pectinate.

Two species are known to me, the following being in brief their diagnostic characters:

Second and third joints of antennæ together distinctly longer than the fourth; basal sulci of thorax very feeble, hind angles not carinate. Thorax square.
pullatus.

Second and third joints of antennæ together not longer than the fourth; basal sulci of thorax were marked, hind angles carinate. Thorax longer than wide.
gracilis.

E. pullatus n. sp.—General form of a slender *Horistonotus*, color pale brown, sparsely clothed with short paler pubescence. Head moderately closely punctate. Thorax nearly square or very slightly longer than wide, base slightly broader, apex feebly emarginate, sides very slightly arcuate, hind angles slightly divergent, not carinate, disc moderately convex, finely not closely punctate, very sparsely pubescent, basal sulci short. Elytra a little wider and a little more than three times the length of the thorax, moderately deeply striate, striæ punctured, intervals convex, sparsely punctulate. Body beneath very finely sparsely punctulate, finely pubescent. Legs rufo-testaceous. Length .34 inch; 8.5 mm.

The general appearance of this insect is that of an elongate Horistonotus and somewhat that of Athous.

Two specimens, Arizona.

E. gracilis n. sp.—Form rather slender as in *Oestodes*, color rufo-piceous or brownish, sparsely pubescent. Head very sparsely punctate, front with vague broad depression. Antennæ testaceous, second and third joints nearly equal, together not longer than the fourth. Thorax distinctly longer than wide, apex and base equal, the hind angles, however, slightly prolonged and divergent, finely carinate, sides very slightly arcuate, apex very slightly emarginate, basal sulci well marked; disc moderately convex and shining, finely not densely punctate, sparsely pubescent. Elytra a little wider than the thorax and about three times as long, striate, striæ punctured, intervals convex sparsely punctate and very sparsely pubescent. Body beneath finely not densely punctate, a little more coarsely on the abdomen which is also darker in color. Legs rufo-piceous. Length .28 inch; 7 mm.

This species is smaller and more slender than the preceding and differs more especially in the characters given in the tabular comparison. Its form is not only like Oestodes but still more like Aphricus, and the species superficially is so difficult to distinguish from the latter, that before a closer examination I had supposed them to be identical.

Occurs in New Mexico.

Digitized by Google

On the North American ASILIDÆ (Part II).

BY S. W. WILLISTON, M. D.

The present article is a continuation of the one in volume xi, pp. 1–35 of these Transactions, and includes the remainder of the Asilidæ, with the exception of the genus *Asilus* (*sensu lat.*). A considerable amount of material I have accumulated in this latter group, and descriptions are in manuscript, but the many problems they offer, yet unsolved, render their present publication inexpedient.

DASYPOGONINÆ.

Stichopogon trifasciatus Say.

Specimens from Kansas show no differences from New England ones.

Ablautatus mimus O. S.

This species also occurs in Arizona.

Laphystia sexfasciata Say.

Specimens of this species from Montana differ appreciably from those from the Southern States that I have seen. In all the Northern specimens the pollinose bands of the abdomen are all entire, while in the Southern ones they are mostly interrupted; the femora, moreover, in the former are mostly yellow, while in the others they are chiefly black. These differences, if not sufficient to warrant specific separation, may be varietally indicated by the name *notata* Bigot, for the Southern form.

Myelaphus lobicornis O. S.

I have seen a specimen of this species in which the fourth posterior cell is wide open. It is doubtful whether the species which I described in the first part of this is the same. *Ceraturgus dispar* Loew (Syst. Beschr. 3d Suppl. Band. p. 122) from Europe is apparently a *Myelaphus*.

Aphamartania fur n. sp.

♂.—Length 6½ mm. Small, black, thickly white pollinose. Head and antennæ in structure like those of species of *Nicocles*, except that the vertex is not so deeply excavated on the sides of the ocelli. Face and front with a silvery-white pubescence, the former otherwise bare, except a thin row of white hair on the oral margin, and the latter with a few white hairs. Antennæ black, slender. Thorax thickly white pollinose, bare, except the weak white bristles; dorsum with two slender, brown, median stripes, and two small, less definite brown spots on each side, the one before, the other behind the suture. Abdomen rather short and

Digitized by Google

slender, a little broader at the base, not flattened or expanded distally, shining bluish black; the venter, sides, and posterior angles above, not reaching quite across behind on the posterior segments, white pollinose like the thorax; hypopygium thickened, of moderate size, white pollinose. Legs black, rather thinly clothed with white pile and bristles, hind tibiæ rather stout, in structure like those of *Nicocles scitulus* Will. Wings hyaline, faintly yellowish tinged on outer half, first longitudinal vein and costa, beyond the tip of auxiliary vein, a little thickened.

One specimen, Arizona (Prof. Comstock). I see no reason why this species should not be placed in this genus. I would also place *Taracticus brevicornis* and *Nicocles scitulus* of my previous paper in this same genus, and I doubt very much the expediency of separating *Blacodes bellus* Loew.

LAPHRINÆ.

LAPHRIA.

The following table includes only such species as are known to me. *Lampria felis* is included, as the femora below do not show the tubercles characteristic of that genus.

1.—Legs wholly black ..... 2.
Legs not wholly black ..... 10.
2.—Wholly black pilose, except on dorsum of abdomen, where it is dense and bright red ..... **anthrax** Will.
Head and thorax not wholly black pilose ..... 3.
3.—Dorsum of abdomen with a large, elongate, red-pilose, red spot; facial gibbosity large, hemispherical ..... **gilva** Linné.
Abdomen without such spot; facial gibbosity not unusually large ..... 4.
4.—Head clothed wholly with reddish pile and hair; venter black.. **vultur** O. S.
Head with more or less black hair or pile ..... 5.
5.—Face with abundant long yellowish white pile more or less concealing the small gibbosity ..... 6.
Facial gibbosity conspicuous, the light colored pile confined to the sides above ..... 7.
6.—Abdomen wholly black ..... **vivax** Will.
Venter, and posterior angles of the segments above, red.
ventralis n. sp.
7.—Abdomen nearly bare ..... 9.
Abdomen with conspicuous light colored pile ..... 8.
8.—Face with yellow pile, beard yellow ..... **ferox** Will.
Pile of face above and the beard white ..... **sericeus** Say.
9.—Dorsum of the thorax in the male with light yellow, in the female wholly black pubescence and pile ..... **franciscana** Big.
Dorsum in both sexes with sparse white pubescence; eastern species.
canis Will.
10.—Head, margin of the thorax, and the abdomen with thick yellow pile.
saffrana Fabr.
Thorax without such pile; smaller, nearly bare species ..... 11.

Digitized by Google

1.—Abdomen wholly black; legs yellowish red.....**pubescens** Will.

Tip of abdomen, legs, humeri, scutellum and antennæ yellowish red.
ruficauda n. sp.

Abdomen except the base, and hind femora below, yellowish red.
Xanthippe Will.

Abdomen except the base, and legs wholly, yellowish red.....**felis** O. S.

Laphria gilva Linné.

To the synonomy of this species, given in my previous paper, the following should be added:

Laphria bilineata Walker, List, etc., iv, 1156; Williston, Trans. Amer. Ent. Soc. xi, 30.

Laphria ventralis n. sp.

♂, ♀.—Length 12–14 mm. Black. Face rather thickly clothed with straw-yellow pile and hair, on the gibbosity with some black bristles. Beard yellow. Antennæ black. Thorax with straw-yellow pile, the disk of the dorsum with short sparse black pile. Abdomen thickly clothed with appressed yellow pile, changeable in different lights, but the pile more erect on each side of the segments in front and ground color hence, here more apparent; the venter and the posterior angle of each segment on the dorsum, beginning with the second or third and successively becoming larger, so that the two spots approach or meet narrowly behind on the last segments yellowish red. Legs black, the tibiæ with short black pile; bristles black. Wings tinged with brownish, except at the base.

Two specimens, California (Baron).

Is closely related to *L. vivax*, but will be distinguished by the color of the venter and the posterior angles of the dorsal segments.

The length of *L. vivax* as given in the original description is too great; it should have been 18 mm. instead of 22 mm.

Laphria ruficauda n. sp.

♀.—Length 18 mm. Head black; face in the middle shining, on the sides lightly whitish pollinose and with sparse white hair, gibbosity small, covered with rigid, porrect, black bristles. Antennæ red. Occiput white pollinose; pile of the beard white; occipito-orbital and mental bristles black. Thorax bluish black, covered with a delicate whitish dust, leaving two slender median stripes that reach to about the suture, and a large spot in front and another behind the suture, on each side, shining; a spot on the humeri, and the scutellum, shining mahogany-red; dorsum bare, with sparse, slender rows of black hairs; bristles black; pleuræ, coxæ and femora with sparse, long, white pile. Abdomen nearly bare, shining cobalt-bluish black, sixth and seventh segments and the ovipositor shining mahogany-red; pile on the sides of the first three segments white. Legs wholly shining red, the tibiæ with similarly colored, the tarsi in part, with black bristles, the tarsi with short golden pile. Wings tinged with blackish on outer part, near the base hyaline.

One specimen, San Domingo (Frazar).

Digitized by Google

Laphria (*Dasyllis*) **saffrana.**

Laphria saffrana Fabricius, Syst. Antl. 160, 18; Wiedemann, Dipt. Exot. i, 234, 4; Auss. Zw. i, 504, 9.

♂, ♀.—Length 19-22 mm. Head black, concealed beneath abundant sulphur-yellow pile, on the sides of the face below, near the oral margin, with a small quantity of black pile. Antennæ yellowish red. Dorsum of thorax black, with a slight bluish reflection; humeri and post-alar callosities red; the margins except, in the middle in front, yellow pilose, leaving the black of the disk in the shape of a spade of playing cards, in the middle of which on the suture there are two small yellow pilose spots; pleuræ more pitchy black, with a small tuft of yellow pile in front of the wings. Abdomen black and yellow, densely clothed with appressed golden-yellow pile; venter yellow, thinly pilose. Coxæ and legs yellow with yellow pile, the femora on their upper sides sometimes brownish or blackish. Wings dark brownish, with sub-hyaline spots in the posterior cells.

Four specimens, Fla. (Frazar, Pergande); N. C. (Prof. Comstock)

Andrenosoma fulvicauda Say.

A comparison of specimens from Maine and California shows no appreciable differences.

Andrenosoma chalybea n. sp.

♀.—Length 10.5 mm. Head black; face and front thickly white dusted, the former with sparse white hairs on the sides, the gibbosity with thin black bristles. Antennæ black. Beard white; occiput thickly white pollinose. Thorax black, moderately shining, the dorsum with a slender median stripe and lateral markings of grayish pollen; pleuræ pollinose, with a shining spot; scutellum deep shining blue-black. Abdomen bare, deep shining steel-blue, with violet and cobalt reflections; on the sides of the segments with sparse white pile. Legs deep steel-blue, with long sparse white pile and slender black bristles (on the tibiæ and tarsi). Wings clouded on the outer part, hyaline at base; first posterior cell closed, or nearly so, at the margin.

One specimen, San Domingo (Frazar).

Pogonosoma melanoptera Wied.

A single specimen from Florida (Pergande) is evidently of this species. It differs from *P. dorsata* Say in the wings being black and broader, in the face being clothed with black, and in the dorsum of the thorax being shining.

ASILINÆ.

In the following pages I give tables of the species from the United States that are known to me, together with their descriptions. This will comprise nearly all of the species now known from this region; lists of the remaining species recorded from the United States are added. It is needless to state that only specimens in a fair state of preservation can be determined from the tables and descriptions. The species are often difficult enough to distinguish with good material, hence I have forborne to de-

Digitized by Google

scribe a number of new species from illy preserved specimens. The genus Asilus (*sensu lat.*) with its numerous species I have reserved for a future paper.

C.

Asilinæ.—Marginal cell of the wing closed; antennæ with a terminal bristle.

1.—Bristle of antennæ plumose.....**Ommatius.**
Bristle not plumose.....2.
2.—Terminal portion of the third vein curved forwards to meet the costa; usually two sub-marginal cells.....5.
Terminal portion of third vein curved backwards to meet the margin of the wing at or beyond the tip.....3.
3.—Two sub-marginal cells.....**Asilus** (*sensu lat*).
Three sub-marginal cells.....4.
4.—Abdomen shorter than the wings; body thickly pilose, claws obtuse. **Mallophora.**
Abdomen longer than the wings; body thinly pilose.....**Promachus.**
5.—Oviduct cylindrical, with a terminal circlet of spines....**Proctacanthus.**
Oviduct laterally flattened, without circlet of spines.....**Erax.**

MALLOPHORA.

Macquart, Hist. Nat. Dipt., i, 300; 1834.

1.—First posterior cell closed, or nearly so.....2.
First posterior cell wide open; large species.....4.
2.—Fourth, fifth and sixth segments of the abdomen with black pile above. **laphroides.**
Abdomen without black pile.....3.
3.—Femora, tips of tibiæ, and the tarsi black.....**clausicella.**
Legs reddish yellow, except black spots on the femora.....**Guildiana.**
4.—Scutellum and abdomen wholly black pilose above.....**nigra.**
Scutellum and abdomen chiefly light pilose.....5.
5.—Venter black pilose; light colored pile usually bright yellow .....**orcina.**
Venter grayish white pilose.....**bomboides.**

M. ardens Macquart, Hist. Nat. Dipt. i, 302, 4; Dipt. Exot. i, 2, 89, 12; tab. viii, fig. 2.—N. America.

Mallophora bomboides.

Asilus bomboides Wiedemann, Dipt. Exot. i, 203, 37; Auss. Zw. Ins. i, 476, 77.
Mallophora bomboides Macquart, Hist. Nat. Dipt. i, 302, 2; Dipt. Exot. i, 2, 89, 11.

♂—Length 25–27 mm. Large, black. Face black, a little shining in the middle, somewhat pollinose on the sides; a few short, black hairs near the base of the antennæ, the sides and upper part of the face bare; in the middle, extending two-thirds of the way to the antennæ, the proboscis, and posterior orbits, with dense, long, abundant, white pile, somewhat tinged with yellow; posterior orbits on the sides thickly white pollinose. Dorsum of thorax brownish black, on the humeri

Digitized by Google

and post-alar callosities more or less reddish, opaque, nearly bare, the short sparse hair black, across the front thinly white pilose. Pleuræ along the dorso-pleural suture, in front, and on the front coxæ, and in front of the halteres, extending down on to the hind coxæ, with nearly white pile. Scutellum and first three segments of the abdomen with long, abundant, white pile, the last two abdominal segments with shorter white pile; venter wholly and abundantly long white pilose; the fourth and fifth segments above chiefly black pilose. Legs black, or more or less deep red, bristles and hair chiefly black, but more or less intermixed with white, especially on the hind pair; hind tibiæ robust, on the outer half behind with abundant white pile. Wings brown, first posterior cell broadly open.

Hab.—Georgia, Florida. Two specimens (Prof. Riley, G. F. Frazar).

Mallophora orcina.

Asilus orcinus Wiedemann, Auss. Zwei. i, 477, 79.

Mallophora orcina Schiner, Ver. Z. B. Ges. xvi, 711; Osten Sacken, Cat. Dipt. 77.

♂.—Length 16–22 mm. Black, black pilose. Head, thorax in front, before the halteres, and on the scutellum, and the first four segments of the abdomen above, with yellow pile. Basal joints of antennæ and the bristle chiefly luteous. Face shining, along the orbits with yellowish dust, a little pile near the base of the antennæ, and also a few bristles on the face, black; elsewhere the pile is wholly yellow. Orbits thickly white pollinose. Thorax deep black, opaque; with yellow pile across the front border, and a thin fan-like row in front of the halteres, reaching down to the hind coxæ, also a few hairs on the post-alar callosities and in front of the root of the wings, of the same yellow color. Scutellum and dorsum of the abdomen, except the last two segments, thickly and long, yellow pilose; the tip of the abdomen and the venter with black pile. Legs pitchy black, with black pile, especially abundant on the hind tibiæ, with a patch in the middle in front of white pile, and their tarsi on the basal joints above with more sparse hairs of the same color. Wings dark brown, the first posterior cell wide open.

♀. Legs clothed wholly with black.

Hab.—Ga., D. C., Ariz., Va.

Mallophora nigra n. sp.

♂.—Length 24 mm. Deep black, but little shining, everywhere black pilose, except on head, humeri, and hind legs. Face with abundant light yellow hair, on the sides above and on the front with short black pile. Basal joints of the antennæ reddish. Occiput and proboscis wholly light yellow bushy pilose; on the sides of the thorax in front there is also some yellow pile. Dorsum of thorax opaque black, hair on the scutellum and in front of the halteres with a reddish cast. On the under side of the abdomen, near the tip, there are some yellow hairs. Legs deep red, moderately pilose, on the front side of the hind tibiæ, before the tip, with a small patch of silvery white pile, otherwise there is no light colored pile on the legs. Wings yellowish brown, with similarly colored veins; first posterior cell wide open.

Hab.—Minn. One specimen, from Mr. Eugene Keen. The pile of the abdomen and legs is not so long as in *bomboides* or *orcina*.

Digitized by Google

Mallophora laphroides.

Asilus laphroides Wiedemann, Auss. Zw. Ins. i, 483, 88.

Mallophora heteroptera Macquart, Dipt. Exot. i, 2, 90, 13; Tab. viii, fig. 13; Schiner, Ver. Z. B. Ges. xvii, 387.

Mallophora minuta Macquart, Hist. Nat. Dipt. i, 302, 5.

Mallophora laphroides Schiner, Ver. Z. B. Ges. xvi, 711; Osten Sacken, Cat. Dipt. 77; Williston, Trans. Am. Ent. Soc. xi, pl. 2, fig. 11.

♂ ♀.—Length 9–11 mm. Black, with white and light yellow pile. Face wholly clothed with white pile, more or less intermixed with black on the oral margin; palpi more or less black haired; front with sparse black pile; beard abundant, white. Dorsum of thorax sparsely covered with short light yellow pile, on the posterior part and above the wings with fine black bristles; scutellum with abundant and longer light yellow pile. Pleuræ thickly grayish pollinose, on the upper part with light yellowish, on the lower part and on the coxæ with white pile. Abdomen flattened above, depressed, black, but little shining; on the sides of the segments toward the base, and the posterior angles of the fourth, fifth and sixth segments with moderately abundant, light yellow pile, and which forms slender faint cross-bands on the hind margins of the segments; on the posterior portion of the third segment, and the fourth, fifth and sixth segments, except the posterior part, with short black pile, not abundant; venter wholly light yellow pilose. Legs black; tibiæ reddish yellow, a few black bristles on the outer part of the hind femora above, more or less on the outer sides of all the tibiæ and the tip of the hind pair and all the tarsi with black pile; elsewhere the pile is white, moderately abundant. Wings hyaline, with a brownish shade along the front margin; marginal cell broader than usual; first posterior cell closed.

Hab.—Ga., Pa. (Macq.), Ky. (Wied.), Brazil (Schiner). Four specimens, Georgia.

That this is Macquart's *heteroptera* does not seem at all doubtful, although he describes the front and hind tibiæ as being black at their tips and the legs clothed with yellow pile. That the species is also Wiedemann's *A. laphroides* seems evident. His description of the abdomen as having the "Seitenränder vom vierten Abschnitte an schwarzbehaart" is not readily understood without one examines the specimen directly from above, when his meaning is very apparent.

Mallophora clausicella.

Mallophora clausicella Macquart, Dipt. Exot. 4e Suppl. 79, 27; tab. vii, fig. 8.

A single male specimen from Pennsylvania, collected by my zealous young friend, Mr. E. W. Keen, though closely allied to *M. laphroides*, yet is evidently different. It agrees throughout with Macquart's description of *M. clausicella*, which he thought might be a variety of his *M. heteroptera* (= *M. laphroides*). It differs from *M. laphroides*, besides the rather larger size (12 mm.) in the abdomen being without black pile on the distal segments, in the pile of the tibiæ being much more abundant and more yellowish, in the distal end of the hind tibiæ

Digitized by Google

being broadly black and black pilose, and perhaps also in the anterior cross-vein not being opposite but distinctly beyond the base of the first sub-marginal cell.

Mallophora Guildiana n. sp.

♂ ♀.—Length 11–13 mm. Black. Head wholly white pilose, except sometimes a few black hairs on the basal joints of the antennæ. Face, as far as seen beneath the pile, white pollinose. Occiput densely white pollinose. Dorsum of thorax moderately thickly whitish pollinose and with short, thin, yellowish white pile, longer behind. Scutellum thickly white pilose. Pleuræ thickly whitish pollinose and with white pile. Abdomen depressed, lightly pollinose on the sides, wholly clothed with moderately abundant, yellowish white pile, white on the second segment, sparse, allowing the black ground-color to be readily seen on the anterior part of the segments, on the posterior part of each segment with a band of white pollen. Legs yellow, tip of femora, and the tarsi, darker or reddish; a black spot on the upper anterior part of all the femora, smallest on the front pair; pile wholly yellowish white, the hind femora on the outer side below, and above near the tip, the outer posterior border of the hind tibiæ, and the upper part of the hind tarsi, with slender black bristles; tip of all the tibiæ on the inner side and all the tarsi with short black bristles. Wings wholly hyaline; first posterior cell closed, or nearly so.

Hab.—W. Kans., Mont., N. C. Five specimens collected by my friend, Mr. E. W. Guild, to whom I am indebted for not a few specimens from Western Kansas; also one from Montana (Prof. J. H. Comstock).

I am not at all sure but that this will prove to be only a variety of *clausicella*.

PROMACHUS.

Loew. Linn. Ent. 390; 1848.

1.—Abdomen with a broad black spot in front of each segment, behind and on the sides densely yellowish brownish pollinose; hypopygium without silvery white pile above.....2.
Abdomen not so marked, hypopygium with silvery white pile above.....3.
2.—Thorax deep reddish brown.....**vertebratus.**
Thorax grayish.....**rufipes.**
3.—Abdomen uniformly grayish pilose, except the narrow incisures.....**Fitchii.**
Abdomen not uniformly pilose.....4.
4.—Abdomen densely brown pollinose on the sides.....5.
Abdomen grayish pollinose on the sides, extending across narrowly on the hind margins of the segments.....**princeps.**
5.—Hypopygium of male small, legs chiefly black.....**albifacies.**
Hypopygium not small, legs chiefly yellowish red.....**Bastardii.**

Promachus Wiedemann, Dipt. Exot. i, 201, 34; Auss. Zw. Ins. i, 485, 90 (*Asilus*).—Ga.

Digitized by Google

Promachus Fitchii.

Trupanea apivora Fitch (not Walker), Country Gentleman, vol. xxiv, p. 63, 1864; Reports, iii, 251–256; tab. 4, fig. 7.

Promachus apivorus Osten Sacken, Cat. Dipt. 78.

Promachus Fitchii Osten Sacken, Cat. Dipt., Note 121, p. 234.

♂, ♀.—Length 22–26 mm. Head rather thickly clothed with light yellowish whitish hair and pollen, the occipito-orbital bristle and the hair of the palpi sometimes black. Antennæ rather distant at their base, brownish red, the third joint black, not broad. Thorax densely gray pollinose and with nearly white pile; markings of the dorsum indistinct, clothed nearly wholly with very short black hair; bristles black. Abdomen rather broad, especially in the female, wholly clothed with moderately abundant and recumbent yellowish gray pile, narrowly bare at the incisures; hypopygium elongated, mostly reddish, clothed above with recumbent silvery white pile. Wings rather small, only lightly tinged; veins luteous. Legs red, with light colored pile and black bristles, the femora often in large part black on the under side. (The eyes of this species are of a brilliant green in life, traces of which often remain in the dried insect.)

Hab.—Neb. (Fitch), Kans., Conn.

A single specimen from Minnesota (Mr. E. Keen), too much rubbed for description, may be confounded with this. The antennæ are, however, situated close together at their base, the face is much more prominent below, the femora are black, and the tibiæ more yellow.

Promachus rufipes.

Asilus rufipes Fabricius, Syst. Ent. 794, 16; Ent. Syst. 383, 32; Wiedemann, Dipt. Exot. i, 203, 38, Auss. Zw. Ins. i. 487, 93.

Dasypogon rufipes Fabricius, Syst. Antl. 169, 23.

Promachus rufipes Schiner, Verh. Z. B. Ges. xvi, 688; Osten Sacken, Cat. Dipt. 78; v. d. Wulp, Tijdschr. voor Ent. xxv, 107.

♂, ♀.—Length 26–30 mm. Antennæ black, with more or less short black hair on the first two joints, third joint small, not broader than the first. Front and face densely covered with light grayish yellow pollen, face bare on the sides and with only a little hair of the color of the pollen; the bristles in the middle and in the oral margin are rather strong and sparse, of a little lighter color than the face, though sometimes a little intermixed with black ones. Front with some short black hairs. Occipito-orbital bristles (in part or wholly) and the beard yellowish white. Thorax dark reddish brown, the dorsum above with two broad, darker stripes, narrowly separated and obsolete behind, in front with short black hairs, behind with sparse black pile and black bristles; pleuræ with sparse blackish pile in the middle and straw-yellow pile in front, and behind in the row in front of the halteres. Abdomen elongate, not at all convex on the sides, densely light grayish yellow pollinose on the posterior half of each segment, and on the sides and venter, on the front portion of each segment (nearly a half of the width in the anterior segments, but less behind) not extending to the sides, and rounded on the posterior angles, opaque black; the line between the black and yellow is sharply marked; the pile is recumbent not abundant, except on the sides in front and on the venter, where it is quite long; on the black it is more or less black, elsewhere like the pollen (the light pile may encroach more or less on the black

Digitized by Google

of the anterior segments). Ovipositor and hypopygium black, the latter small and thinly black pilose. Legs black, with black and whitish pile, and black bristles; all the tibiæ light red except the tip. Wings very distinctly tinged with yellowish.

Hab.—Ga., Fla. Six specimens.

A specinen from Illinois I refer, doubtfully, to this, from the darker color of the thorax; it has, however, the femora red above.

Promachus vertebratus.

Asilus vertebratus Say, J. Acad. Phil. iii, 47; Compl. Wr. ii, 62; Wiedemann, Auss. Zw. Ins. i, 485, 91.

Trupanea vertebrata Macquart, Dipt. Exot. i, 2, 103, 27.

Promachus vertebratus Schiner, Verh. Z. B. Ges. xvi, 688.

♂.—Length 25 mm. Seven specimens from Kansas I refer to this species; they resemble *P. rufipes* very much, though probably different. The third joint of the antennæ is more broadly oval and shorter, as is the whole antenna; the third joint is, moreover, yellowish at the base. The front is comparatively broader, and the thorax is more grayish, not reddish brown. The color of the pollen throughout is less yellowish.

In one of these specimens the tip of the tibiæ is not black, and the tarsi are yellowish. The differences between this and *rufipes* are not the most satisfactory, but the deeper brown color in *rufipes* renders this easily distinguishable to the eye.

Promachus princeps n. sp.

Promachus n. sp. Williston, Trans. Amer. Ent. Soc. xi, pl. ii, fig. 15.

♂, ♀.—Length 25–27 mm. Face covered with white pollen and white hair, the bristles rather thin and abundant on the middle, above them the hair is rather abundant, below the antennæ; along the oral margin on each side there are about four rather weak black bristles; the ground-color of the face on each side is in part red. Antennæ black, the first joint with white, the second with black hair, third joint broadly ovate, but little less than half as wide as long. Front thickly gray pollinose, with white hair, except some short black bristles on the sides and ocelli. Occipito-orbital bristles black; beard silky white, as is also the hair on the proboscis below, the palpi with more or less black bristly hairs. Dorsum of thorax thickly grayish pollinose, with two brownish median stripes, separated by a linear interval, and on each side with larger, less distinct brownish spots; clothed with short sparse black hair, behind and on the scutellum with long white pile, bristles black; pleuræ thickly pollinose and with sparse white pile; the ground-color of the humeri, less distinctly on the post-alar callosities, and portions of the coxæ, is yellowish red, the thorax elsewhere is black. Abdomen black, but little shining, with very short black hair, the sides of all the segments broadly gray pollinose, extending across on the posterior part of the segments, and with longer, but sparse white hair; seen from in front the abdomen shows a black, somewhat shining spot on each segment, very large on the front segments, so that there is only a narrow gray border behind, becoming successively smaller, so that on the last segment it

Digitized by Google

is scarcely apparent, or only a brownish spot is present. Hypopygium densely covered above with close-lying silky-white pile. Legs black, with short white hair and black bristles; the femora on their upper surface and the base of the tibiæ red. Wings elongate, pure hyaline.

Six specimens, Washington Territory.

Promachus albifacies n. sp.

♂, ♀.—Length 25–28 mm. Closely resembles *E. princeps*, but differs in the front, which is a little narrower above, in the third joint of the antennæ being more slender and spindle-shaped, in the hair of the face more abundant (sometimes slightly tinged with yellow); the dorsum of the thorax in the middle shows three slender brown stripes, separated by two narrow grayish ones; the whole thorax has a more reddish cast, and the bristles on the scutellum are more abundant and sometimes intermixed with more or less black pile. Abdomen as follows: first segment black, but little shining, with short black pile, a little longer on the sides, where there are some black bristles intermixed with long white pile; second segment black like the first, with short, not abundant, black pile, long and more abundant toward the side in front, the sides of the segment rather broadly chestnut-brown pollinose, extending further inwards behind (about a third of the width of the segment), clothed except in front with moderately long, recumbent white hair; third, fourth and fifth segments similar, the black becoming less in extent and more triangular in shape, so that on the fifth segment the brown pollinose, white-haired spots nearly touch each other at their tips; sixth segment with only a small black spot; in the female the brown pollen does not extend so far inwards on the posterior segments. Hypopygium smaller than in *P. princeps*, thickly clothed above with recumbent, silvery-white pile. Legs black, with white pile (except on the hind tarsi) and black bristles; all the femora above broadly, and the tibiæ, except the tips, especially of the hind pair, red, base of the tarsal joints also red. Wings as in *P. princeps*.

Twenty-four specimens, Arizona (Prof. Comstock).

Promachus Bastardii.

Trupanea Bastardii Macquart, Dipt. Exot. i, 2, 104, 30.

Asilus laevinus Walker, List, etc., ii, 392 (Type compared by Osten Sacken).

Promachus Philadelphicus Schiner, Verh. Z. B. Ver. xvii, 389 (Type compared by Osten Sacken).

Trupanea rubiginis Walker, Dipt. Saund., 123 (Type compared by Osten Sacken).

Asilus ultimus Walker, Dipt. Saund., 136.—U. S.

Promachus Bastardii Osten Sacken, Cat. Dipt. 78.

♂, ♀.—Length 22–26 mm. Head rather thickly clothed with light yellow pile and hair, the occipito-orbital bristles chiefly black (there are no bristles on the face). Antennæ deep brownish red, the third joint small and more or less blackish, palpi chiefly black bristly. Thorax with light grayish and brownish dust on the dorsum, the markings showing but feebly, on the pleuræ more distinctly brownish dusted; dorsum in front clothed with short black hair; behind, on the scutellum and on the pleuræ, with white long pile. Scutellum with numerous black bristles, as also on the back part of the dorsum of the thorax. Abdomen black; venter deep densely chestnut-brown pollinose, which color encroaches on the sides of the dorsal segments, forming a trapezoidal spot, becoming successively larger, and which is clothed with white hair, bushy on the anterior segments, sparser and

Digitized by Google

more recumbent behind; the first and second segments on the sides with black bristles. Hypopygium of considerable size, thickly covered above with silvery-white pile. Legs red, the femora and sometimes the tibiæ with longitudinal black spots, clothed with yellowish hair and black bristles; hair on the front tarsi deeper yellow, more abundant, on the middle and hind tarsi prevailing black. Wings tinged with pale brownish.

Hab.—New England, Middle States.

Numerous specimens from New England, Pennsylvania, etc. The species is nearest allied to *albifacies*, but the hair is more yellow, the body is less slender, the hypopygium is larger, and the legs are lighter colored. I should be very much inclined to identify this species with Wiedemann's *Asilus quadratus*, were it not that Schiner was acquainted with the type of that species, and would hardly have redescribed it under the name of *Philadelphicus* were they the same.

ERAX.

Macquart, Dipt. Exot. i, 2, 107; 1838.

MALES.

1.—Costa distinctly thickened and dilated beyond the tip of the auxiliary vein.2.
Costa not distinctly thickened, etc (slightly thickened in *Bastardii*).....5.
2.—Hind tibiæ on outer third angulated and fringed.....**tagax.**
Hind tibiæ simple; dorsum of thorax more or less mane-like.....3.
3.—Hypopygium large, costa considerably thickened; scutellum with long black hair and without distinct macrochætæ.....**jubatus.**
Hypopygium of moderate size; scutellum with macrochætæ.....4.
4.—Third, fourth and fifth abdominal segments with long silvery-white pile. **costalis.**
Third-fifth segments without such pile.....**latruncnlus.**
5.—Abdomen with long silvery-white pile, parted in the middle and directed outward.....6.
Abdomen without such pile.....8.
6.—Three sub-marginal cells.....**anomalus.**
Two sub-marginal cells.....7.
7.—Hypopygium elongate; legs black.....**stamineus.**
Tibiæ yellowish red.....**dubius.**
8.—Hypopygium unusually small; dorsum of thorax only gently convex longitudinally.....**lateralis.**
Hypopygium not unusually small.....9.
9.—Abdomen black, black pilose, the last two segments silvery; mystax straw-yellow.....**aestuans.**
Abdomen more or less light pilose and pollinose.....10.
10.—Second sub-marginal cell more than half of the length of the first.**varipes.**
Second sub-marginal cell not half the length of the first.....11.
11.—Abdomen nearly uniformly grayish pollinose.....**leucocomus.**
Abdomen conspicuously black.....12.
12.—The last two segments silvery .....**furax.**
The last three segments silvery.....**Bastardii.**

Digitized by Google

FEMALES.

1.—Dorsum of thorax with a mane-like crest.....2.
Dorsum of thorax without such crest.....3.
2.—Tibiæ and tarsi yellowish red; abdominal segments broadly pollinose on the margin.....**latruncu us.**
Abdominal segments narrowly pollinose on the hind margins.....**jubatus.**
3.—Three sub-marginal cells.....**anomalus.**
Two sub-marginal cells.....4.
4.—Face in profile moderately concavé below the antennæ; femora in part red; abdomen black, the second and third segments with a large white spot on each side behind second sub-marginal cell long.....**lateralis.**
Face with a short deep concavity.....5.
5.—Mystax straw-yellow; abdomen chiefly black; furcation of third vein before the base of second posterior cell.....**aestuans.**
Mystax white or black.....6.
6.—Abdomen nearly uniformly white pollinose; furcation of third vein beyond the base of the second posterior cell; tibiæ yellow with black tip; large species.....**leucocomus.**
Abdomen with distinct black markings.....7.
7.—Segments of abdomen with a median black triangle.....**similis.**
Segments of abdomen black with a pollinose margin.....8.
8.—The strong facial gibbosity in large part clothed with black bristles; abdomen with the lateral borders and hind margin pollinose.....**Bastardii.**
Head wholly clothed with white, 3–6 abdominal segments each with two large black spots.....**furax.**

Additional species from the United States:

Erax albibarbis Macquart, Dipt. Exot. i, 2, 118, 26.—N. Am.

E. apicalis Wiedemann, Dipt. Exot. i, 119, 16 (*Asilus*); Auss. Zw. Ins. i, 443, 28.—N. Am.

E. completus Macquart, Dipt. Exot. i, 2, 117, 23; tab. ix, fig. 9.—N. Am.

E. macrolabis Wiedemann, Auss. Zw. Ins. i, 458, 51 (*Asilus*).—Ky.

E. niger Wiedemann, Dipt. Exot. i, 196, 26; Auss. Zw. Ins. i, 460, 54 (*Asilus*). —N. Am.

E. notabilis Macquart, Dipt. Exot. i, 2, 110, 6; tab. ix. fig. 8.—Am.

E. pogonias Wiedemann, Dipt. Exot. i, 198, 29; Auss. Zw. Ins. i, 460, 54 (*Asilus*). —N. Am.

Dasypogon barbatus Fabricius, System Antl. 169, 22.

E. vicinus Macquart, Dipt. Exot. ler. Suppl. 85, 36.—Texas.

E. stylatus Fabricius, Wiedemann, Auss. Zw. Ins. i, 462, 57, and

E. macularis Wiedemann, l. c. i, 447, 33, South American species, are referred to North America by v. d. Wulp, Tijdschr. voor Ent. xxv, 112.

I have spared no labor in endeavoring to identify my specimens with the above species and the long list from Mexico, but with poor results.

Erax tagax n. sp.

♂.—Length 25–28 mm.—Face deeply yellowish gray pollinose, bare above and on the sides, on the gibbosity with white hair interspersed with black bristles, a row of the latter extending along the oral margin; the gibbosity arises very sharply

Digitized by Google

and prominently a little above the middle of the face. Antennæ black; the first two joints with short white hair, the third joint scarcely as long as the first. Front narrowed above, with white hair, a few black bristles on each side below, the ocelli with two conspicuous black bristles. Occipito-orbital bristles black, the beard abundant, silky-white; bristles on the palpi black. Thorax strongly convex behind, clothed with short black hairs and black bristles, in color reddish brown, with yellowish gray pollen, varying in different reflections, the two median dark brown stripes distinct, separated by a narrower pollinose stripe, in front of the scutellum in certain lights a slender brown triangle, the ground color of the central stripe and the humeri often red. Scutellum thickly dusted, with black bristles on its border. Pleuræ thickly gray pollinose, with whitish pile, except a little black on the mesopleuræ. Abdomen slender, brownish black, a little shining; first segment wholly whitish pollinose; second to the fifth segments thickly whitish pollinose on the sides, extending inwards on the posterior angles but not quite meeting in the middle; between the black and the gray on each side there is a semi-lunar spot of brown; sixth and seventh segments wholly silvery-white pollinose, except a slender brown longitudinal spot on the dorsum of the sixth; hypopygium large, black, with black pile. Legs with white hairs and black macrochætæ, the hind tibiæ on the inner sides and their metatarsi with short orange-red pile; in color the femora on the under side, the tips of the tibiæ, and the tarsi are black, elsewhere deep red; in structure the hind tibiæ are rather slender for the basal two-thirds then dilated and on the outer side distinctly angulated, just below the knee on the outer side there are two conspicuous bristles bent downwards, and on the front side on the distal fourth with a brush of short black pile. Wings nearly hyaline, a little yellowish behind; the furcation of the third vein beyond the distal end of the discal cell, the anterior cross-vein near the outer fourth; costal vein distinctly thickened and curved outward beyond the tip of the auxiliary vein.

♀. Two rubbed females show the structure of the head and thorax as in the male, the hind tibiæ and the wings normal, not dilated.

Hab.—Arizona.

Erax jubatus n. sp.

♂.—Length 18–19 mm. Black. Facial gibbosity large and protuberant. Face deep brown, covered with moderately thick grayish pollen, especially near the eyes; mystax composed of black and white hairs, long, abundant, spread out helmet-shaped. Antennæ black, the first two joints with black and white hair, the third joint small. Front clothed with rather long black hair. Beard abundant, silky-white; occipito-orbital bristles slender, mostly black. Dorsum of thorax strongly convex, deep brown with grayish yellow pollen, along the middle a moderately broad row of long, thick pile or hair, beginning in front and reaching to near the scutellum; on the posterior part, however, diffuse and longer; in front the sides of the dorsum have only diffuse sparse short pile. The bristles are short and rather thin; on the scutellum with long hair, its border with thin bristly hairs. Pleuræ thinly pollinose, and with sparse, long, pile. Abdomen black, clothed on the upper side with long silky, not abundant, mostly white pile, the third, fourth and fifth segments with a posterior, rather narrow gray pollinose border, on the sides of the segments broader and more brownish; sixth and seventh segments wholly silvery-white; hypopygium large, black, with black pile; venter with tufts of long silky-white pile. Legs black, with silky-white pile; tibiæ and

Digitized by Google

tarsi chiefly dark red. Wings hyaline, costa beyond the tip of auxiliary vein conspicuously thickened; furcation of third vein beyond the base of second basal cell.

♀. Abdomen deep black, with a posterior, rather narrow, pollinose posterior margin to each segment; the lateral margins of the segments more broadly pollinose, costa of wings simple.

Two specimens, New Mexico (G. F. Gaumer).

✓ **Erax latrunculus** n. sp.

♀.—Length 15–19 mm. Facial gibbosity prominent, the concavity below the antennæ short and rather deep. Gibbosity clothed chiefly with white hair, but the oral margin and the middle of the convexity intermixed with black. Front and face on the sides thickly clothed with whitish pollen. Antennæ black, the first two joints with short white hair, and below usually with one or two black bristles. Front and occiput with white vestiture, the former only with two bristles, usually black, near the ocelli. Thorax strongly convex, somewhat compressed in front, along the middle with a rather thin row of black pile and hair, mane-like, beyond the suture it widens into a patch of longer black bristles, in the middle of which in front is continued the row of black or white pile; on the posterior part in front of the scutellum and on its dorsum there is sparser white pile. The dorsum of the thorax in front on the sides with sparse short black, the pleuræ with very thin white pile. The thoracic dorsum has brownish dust; the pleuræ rather thickly grayish dusted; bristles of the dorsum and border of the scutellum moderately stout, mostly black. Abdomen black, with white pile, not long nor abundant; second, third and fourth segments on the sides, and rather broad posterior cross-bands, white pollinose; fifth, sixth and seventh segments wholly silvery-white pollinose, except a black spot in the middle of the fifth segment in front; hypopygium of medium size, shining black, chiefly black pilose, the pile not long nor abundant. Femora black, legs elsewhere red. Wings hyaline, the costa a little dilated beyond the tip of auxiliary vein; anterior cross-vein beyond the middle of discal cell, the furcature of the third vein beyond the outer end of the discal cell.

♀. Segments of the abdomen broadly grayish pollinose on the side and behind; wings not dilated on the outer costa.

Hab.—Arizona, Montana. Twelve specimens (Professor Comstock).

✓ **Erax furax** n. sp.

♂.—Length 16–19 mm. Head wholly clothed with white pile and hair, very rarely a few black hairs near the ocelli. Face in profile only moderately concave, densely white pollinose; the pollen of the front a little yellowish. Thorax densely gray pollinose, the dorsum often brownish; the median stripes not distinct, confluent posteriorly; dorsum in front clothed with very short black hairs, posteriorly with sparse, slender, black, sometimes white bristles and shorter sparse white hairs. Upper surface of the scutellum with sparse white hair, its border with weak black or white bristle. Pile of the pleuræ wholly white, very thin. Dorsum of the abdomen rather thickly grayish pollinose; second segment on each side rarely immaculate, usually with a brownish or brown spot, sometimes with a black spot; the spots on the third, fourth and fifth segments successively larger, nearly always confluent on the fifth, and often confluent or nearly so on the fourth; fifth segment with a narrow silvery hind border; sixth and seventh segments wholly

Digitized by Google

silvery-white. Hypopygium deep red, of moderate size, thinly black and white pilose. The pile of the basal segments is not abundant, white, on the venter below with loose tufts. Legs black, with white pile and white and black macrochætæ; front and middle tibiæ, except the tip, and hind tibiæ, except the distal third or half, red or yellow. Front and middle tarsi deep red, hind tarsi usually blackish. Wings hyaline; anterior cross-vein at the middle, furcation of the third vein a very little beyond the distal end of the discal cell.

♀. Second abdominal segment usually with a brownish spot, sometimes with a blackish spot on each side; the remaining segments each with a pair of large quadrate spots, rather narrowly separate.

One male from Washington Territory, five males from California, one male and two females from Western Kansas, ten males and eight females from Arizona and two females from Connecticut.

Erax stamineus n. sp.

♂.—Length 15–17 mm. Face, beard and antennæ wholly with yellowish white hair or pile, the ocellar and occipito-orbital bristles black. Face densely covered with yellowish white pollen. Dorsum of thorax black, moderately shining, not thickly covered with grayish pollen, the usual stripes narrowly separated, the short sparse pile and the bristles black. Pleuræ rather thickly light pollinose, the sparse pile wholly white. Abdomen black, first two segments rather thickly gray pollinose, leaving a rather broad, more black band on the second; third to seventh segments on the dorsum silvery pollinose and rather thickly clothed with silvery-white pile, which is parted in the middle and directed outwards; this white pile is on the second segment also, but less abundantly. Hypopygium elongate, shining black, with light yellow pile. Legs wholly black, with yellowish white pile and black and white bristles. Wings short, hyaline; anterior cross-vein near the middle of the discal cell; second sub-marginal cell very long, the furcation of the third vein takes place only a little beyond the anterior cross-vein.

Two specimens, Montana (Professor Comstock).

Erax n. sp.

♂.—Is very similar to *stamineus*, but is apparently different. The tibiæ and tarsi are all yellowish red except the tips of the former. The hypopygium is distinctly smaller, and the second sub-marginal cell is shorter.

Washington Territory. One specimen.

An additional specimen from Arizona agrees with the preceding except that the second sub-marginal cell is longer than in *stamineus*. Until further material is examined it will be unwise to give them a name.

Erax similis n. sp.

♀.—Length 24 mm. A single specimen with the last seems to be different, in that the head is provided with black bristles, the bristles of the thorax wholly black and the furcation of the third vein takes place opposite the end of the discal cell and not a considerable distance before it, as in the preceding. The abdomen is thickly gray pollinose with a series of black triangles in the middle of the segments, with the base in front and becoming successively less in size; the pile of the legs is short and white, with the bristles black.

Hab.—Arizona.

Digitized by Google

Erax anomalus

Erax anomalus Bellardi Saggio, etc., ii, 32 ; tab. ii, fig. 7.—Mexico.

♂.—Length 20–25 mm. Face densely light yellowish pollinose, the gibbosity and oral margin thickly clothed with yellowish white hair and bristles; in profile there is a short, deep concavity below the antennæ. Antennæ black, the first two joints with short white hairs, the third joint scarcely longer than the first; bristles as long as the antennæ, black. Front deeply excavated below the eyes, narrowed above, clothed with white hairs and bristles, except a few black bristles on the ocelli. Occipito-orbital bristles black, the beard and hair of the proboscis silky-white. Thorax black; the humeri and spots on the pleuræ reddish; the two usual dark stripes of the dorsum are apparent; in front of the suture the dorsum is clothed only with short black hairs, on the posterior part with sparser white and black hair and black bristles. Scutellum on its dorsum with white pile, along its border with about twelve black bristles. Pleuræ thickly whitish pollinose and with sparse white hair. Abdomen black, the swollen hind border of the first segment red on its sides; above wholly and thickly clothed with long silky-white pile, parted down the middle and combed outwards, nearly wanting in the middle of the first and second segment; second segment with a large oval blackish spot in front and the third segment with a smaller one; elsewhere (except the first segment) the dorsum is covered with dense white pollen. Venter also with long, but sparse, white pile. Hypopygium very large, chiefly red, thickly clothed with black and white pile. Legs deep red; front and middle femora and often the hind pair also, except the posterior surface, and the tip of hind tibiæ, black; pile white, long and abundant on the inner side of the tibiæ; macrochætæ black. Wings hyaline; three sub-marginal cells; the furcation of the third vein takes place a little distance before the distal end of the discal cell, the nervure connecting with the second vein short, scarcely longer than the cross-vein at the distal end of the fourth posterior cell.

♀.—Abdomen black, clothed with short sparse white pile. First segment yellowish whitish pollinose; the ground color red behind as in the male, the following segments broadly whitish pollinose on the sides, extending across on the posterior margin, in the middle broad, when seen obliquely from behind, seen from in front a large semi-circular black spot occupies the chief part of the segment, but is of a brownish cast behind. Ovipositor moderately long black. Tibiæ without the abundant silky pile on the inner sides.

Eight males and seven females from Arizona (Prof. J. H. Comstock, E. L. Keen).

Erax leucocomus n. sp.

♂ ♀.—Length 25 mm. Mystax and hair of the head throughout nearly white; face and front densely yellowish white pollinose; the concavity of the face below the antennæ is short and deep. Antennæ black, third joint scarcely longer than the first. Thorax black, thickly whitish yellowish pollinose; the dorsum before the suture clothed with short, erect, black hairs, on the posterior part and on the scutellum with whitish hair and light yellow bristles; the two median longitudinal stripes are slender, brown, separated by a pollinose interval through their whole length, not broader than the stripes behind, twice or thrice as broad in front. Pleuræ densely whitish pollinose, and with white pile. Abdomen black, the hind margins of all the segments yellowish red, everywhere rather thickly covered with whitish pollen and recumbent whitish pile, an oval spot near the middle of each

Digitized by Google

segment a little brownish; ovipositor black; hyypygium large, black, with black pile. Legs black, the tibiæ yellow, their tips and the tarsi reddish brown or blackish. Wings short, hyaline, the veins luteous, the furcation of the third vein takes place a little beyond the end of discal cell; anterior cross-vein a little beyond the middle of the discal cell.

Two specimens, Western Kansas (E. W. Guild, F. H. Snow).

A single ♀ specimen from N. Mexico (E. Keen) closely resembles this, but belongs to a different species. The front is rather broader above; there is scarcely a trace of the dorsal stripes; the abdomen is less thickly pollinose, showing a pair of indistinct blackish spots on the 2–5 segments. The size is also less.

Erax lateralis.

Erax lateralis Macquart, Dipt. Exot. i, 2, 116, 21.

? *Erax ambiguus* Macquart, Dipt. Exot. 1 er. Suppl. 84, 34.

? *Asilus interruptus* Macquart, Hist. Nat. Dipt. 1, 310, 29.

♂, ♀.—Length 21–25 mm. First two joints of the antennæ yellowish red, with short black pile; third joint black, nearly as long as the first two together, only a little shorter than the bristle. Face densely covered with yellowish white pollen, the mystax not very abundant, leaving a bare space on the sides and above, yellowish white; on its upper part with a number of more porrect black bristles. Front a little more yellowish, without any black hairs or bristles. Occipito-orbital bristles black, beard abundant, white. Dorsum of thorax clad with short black hairs, longer toward the scutellum; on the sides, beginning from in front of the wing, with four moderately long black macrochætæ, on the post-alar callosities as many more, and on the posterior part of the dorsum with two short rows of weaker ones. Sides of the dorsum and the pleuræ densely yellowish white pollinose, on the middle of the dorsum there are two distinct blackish brown stripes, contiguous posteriorly, and separated by a linear interval from a lateral less distinct stripe. Pile of pleuræ and coxæ white, except a little black pile on the mesopleuræ. Scutellum yellowish pollinose and white pilose above; along its margin with a row of not very strong black macrochætæ. Abdomen opaque black, and with very short black hairs, except as follows: first segment wholly thickly whitish pollinose and with white pile, except narrowly in the middle, on the lateral margins with a few black bristles; second and third segments, except on their middle portion, with loose white pile, slender in the ♀; when seen from behind their lateral margins and a broad posterior cross-band, broadly interrupted, densely white pollinose; when seen from above often there is only a large black spot in the middle and a smaller one on each side in front; in the male the fourth segment with narrow lateral margins, a little dilated at the hind angles of the fourth and continued across as a narrow smooth hind band on the fifth, likewise white pollinose; in the female there are slender crossbands on the hind margins of the fourth and fifth segments in addition to the lateral margins, in the fourth the band is interrupted, in the fifth entire, or nearly so; in the male the sixth and seventh segments are densely whitish yellowish pollinose, except a small black triangle in the middle above; in the female the yellowish white pollinose sixth segment has a large black triangle, the base of which lies on the slender yellow hind margin, and its tip on the front margin, the seventh segment similar, but the triangle larger. Hypopygium unusually small, reddish, with white pile, except a small

Digitized by Google

tuft of black pile at the base below; ovipositor short, black. Legs with white pile and black macrochætæ; femora black on the under surface, yellowish red above and at the tips; tibiæ yellowish red, the hind pair at the end and all the tarsi black. Wings yellowish hyaline; the furcation of the third vein unusually far forward, about opposite the middle of the penultimate section of the fourth vein.

This description is drawn from fifteen male and ten female specimens from Georgia, North Carolina (from Prof. Comstock), which show but very little variation, and three males and one female from Florida. That it is Macquart's *E. lateralis* is scarcely at all doubtful, although he speaks of the triangular black spots on the sixth and seventh segment of the abdomen in the male as being large; that it is also *E. ambiguus* seems probable, though there are discrepancies, scarcely greater, however, than Macquart was prone to make. The synonomy of *E. interruptus* with *E. ambiguus* is given on Osten Sacken's authority. Two male specimens from Arizona (from Prof. Comstock) show no appreciable difference from the Carolina ones. In three of the Florida specimens the femora are wholly black. In some specimens the ground color of the pleuræ and sides of the abdomen is in large part red.

Erax varipes n. sp.

♂.—Length 24–25 mm. Head wholly clothed with white, and densely white pollinose. Antennæ black, the third joint not longer than the first. Dorsum of thorax grayish brownish pollinose, the brownish black median stripes distinctly separated through their whole length, only reaching a little ways beyond the suture; clothed with short, sparse black hairs, behind with white hair and bristles more or less intermixed with black. Pleuræ thickly grayish white pollinose and wholly white pilose. Abdomen black, grayish whitish pollinose and with similar colored pile, the latter not abundant nor long; the second, third, and fourth segments, when seen from behind, with a large transverse spot more shining in front, faintly divided in the middle by brownish pollen; posterior part of the fifth, and the two following segments bright silvery-white. Hypopygium black, with black and white pile. Legs red; the under side of all the femora, broadly, and the inner side of the tibiæ black, the tarsi darker red or blackish; bristles chiefly black, pile white, the inner side of the tibiæ, especially of the front pair with long abundant white hair. Wings hyaline, anterior cross-vein near the middle of the discal cell, the furcation of the third vein only a little beyond it.

Two specimens, Arizona (Prof. Comstock), Western Kansas (Guild). The legs will probably vary in coloration.

Erax Bastardii.

? *Asilus aestuans* Linne, Syst. Nat. ii, 1007, 5; Amoen. Acad. vi, 413, 95; Fabricius, Syst. Ent. iv, 379, 8.

? *Asilus macrolabis* Wiedemann, Auss. Zw. Ins. i, 458, 51.

Erax femoratus Macquart, Dipt. Exot, i, 2, 115, 20.

Erax incisuralis Macquart, Dipt. Exot. i, 2, 117, 24.

Erax Bastardii Macquart, Dipt. Exot. i, 2, 117, 25; tab. 9, fig. 7; Riley, 2d Rep. 124.

Erax tibialis Macquart, Dipt. Exot. i, 2, 118, 27.

Digitized by Google

♂, ♀.—Length 20 mm. Face and front with yellowish gray dust; facial gibbosity strong, nearly hemispherical, covered with thin black and white bristle and hair; the short hair on the first two joints of the black antennæ is black and yellowish white; hair of the front chiefly black; occipito-orbital bristles not very stout, black; beard abundant, silky-white. Dorsum of thorax with two well-marked black stripes, of nearly equal width, distinctly separated by a pollinose linear stripe, abruptly ending a little distance beyond the suture; on each side, in front and behind the suture, two large, somewhat shining spots; in front of the scutellum a triangular spot; the pollen of thorax is gray with a slightly brownish cast; hair black, moderately long in front, on the dorsum of the scutellum white; bristles, thin, black. Abdomen black, a little shining; the venter and rather broad lateral margins of each segment and a rather narrow hind margin of each thickly gray pollinose; in the male the fifth, sixth and seventh segments silvery-white; hypopygium large, black, with black hair. Legs black; tibiæ, except the tip, yellowish red; bristles black, hair chiefly white, tip of hind tibiæ and first two joints of the hind tarsi with golden yellow pile. Wings hyaline, costal vein in the male a little thickened beyond the tip of auxiliary; furcation of third vein a little distance beyond the base of the second posterior cell.

Hab.—Atlantic and Central States.

Erax aestuans.

Asilus aestuans Wiedemann, Dipt. Exot. i, 200, 32; Auss. Zw. Ins. i, 467, 63.

Erax aestuans Macquart, Dipt. Exot. i, 2, 115, 19; Bigot, Ramon de la Sagra, etc., 791.

Erax rufibarbis Macquart, Dipt. Exot. i, 2, 116, 22.

♂, ♀.—Length 15 mm. Facial gibbosity thickly covered with light yellowish red hair extending nearly to the antennæ, along the oral margin with a row of black bristles. Antennæ black, the first two joints with short black hair. Front on the sides with black hair and on the ocellar tubercle with long black bristles. Occipito-orbital bristles black; the silky beard and the hair of the front coxæ abundant, light yellowish white. Thorax black, rather thickly covered with brown pollen, the dorsal stripes not well defined; bristles and hair black, the latter more abundant and longer along the middle of the dorsum. Abdomen black, moderately shining, with rather long black hair; the venter and lateral margins of the segments rather thickly brown pollinose, in the male the sixth and seventh segments silvery-white; hypopygium large, black, with luteous or black pile; ovipositor shining, short. Legs black; tibiæ, except the distal part, obscurely yellowish red; hair yellowish white, on the inner side of the hind tibiæ and on the hind tarsi black; bristles black. Wings hyaline, tinged with brownish on the outer end; small cross-vein near the middle of discal cell, furcation of the third vein a little distance before the outer end of the discal cell.

Hab.—Eastern States.

It seems evident that this species cannot be the same as *Asilus aestuans* of Linné, as the description, "cinereus, abdominis ultimis tribus segmentis albis" can in no wise be applied. I do not think it expedient or desirable to change the name of this, as the true *aestuans* may be either of several of our species, and hence the name must be given up, permitting *E. aestuans* Wied. to remain.

Of the synonomy of *E. rufibarbis* I have no doubt whatever.

Digitized by Google

PROCTACANTHUS.

1.—Segments of the abdomen pilose on the sides; very large species; femora red. **heros.**

Abdomen nearly bare throughout..... .....2.

2.—Abdomen except the base, red, lightly pollinose; femora red.....**rufus.**

The ground-color of abdomen chiefly black; conspicuously pollinose. .....3.

3.—Abdomen nearly uniformly dark brownish pollinose....**philadelphicus.**

Abdomen not uniformly dark brownish pollinose..... .....4.

4.—Abdomen thickly nearly white pollinose, large species (30–35 mm.). **Milbertii.**

Abdominal segments distinctly brownish above, smaller species (20–22 mm.). **brevipennis.**

Additional species from the United States.

P. fulviventris Macquart, Dipt. Exot. 4e. Suppl. 88, 12.—Fla.
(The length evidently should be 14 lines instead of 4.)

P. longus Wiedemann, Dipt. Exot. i, 183, 1; Auss. Zw. Ins. i, 426, 3 (*Asilus*); Macquart, Dipt. Exot. i, 2, 123, 6; Schiner, Verh. Zool. Bot. Ver. 1866, 682.—Georgia.

P. micans Schiner, Verh. Zool. Bot. Ver. 1867, 397.

P. nigriventris Macquart, Dipt. Exot. i, 2, 124, 9.—Penna., Carolina (= *P. brevipennis?*)

P. virginianus v. d. Wulp, Tijdschr. voor Entom. xxv, 109.—Va.

Proctacanthus brevipennis.

Asilus brevipennis Wiedemann, Auss. Zw. Ins. i, 431, 10; v. d. Wulp, Tijdschr. voor Entom. xxv, 108.

♂, ♀.—Length 20–23 mm. Face and front thickly covered with yellowish white dust. Mystax sparse, white, composed chiefly of bristles. Antennæ black. Beard white, not very abundant, occipital-orbital bristles black. Thorax blackish brown when rubbed, with portions of the dorsum and pleuræ showing more or less red. Dorsum brownish yellowish dusted, showing two median rather broad blackish brownish stripes, indistinctly separated by a linear brown pollinose stripe. Pleuræ thickly yellowish gray pollinose. Abdomen black, in well-preserved specimens wholly covered with rather dense gray pollen, in the middle broadly brownish, but in most specimens the abdomen is evenly and rather thinly pollinose, with only a trace of the brownish pollen above. Hypopygium red. Legs red, the femora on their outer sides broadly black. Wings hyaline, the veins narrowly clouded with yellowish.

Hab.—Ga., Fla., Ky.

Six specimens (Morrison). Is similar in coloration to *P. Milbertii*, but the pollen of the abdomen has a much more distinct brownish coloration, the confluent or narrowly separated median thoracic stripes are broader and much more conspicuous. There is also a great difference in size.

Digitized by Google

Proctacanthus Milbertii.

Proctacanthus Milbertii Macquart, Dipt. Exot. i, 2, 124, 8.

? *Asilus agrion* Jaennicke, Neue Exot. Dipt. 57.

Asilus missuriensis Riley, 2d Report, 122, fig. 89.

♂, ♀. Length 30–35 mm. Face more or less red in ground color, but densely covered with gray pollen, the rather sparse white mystax composed chiefly of bristles. Antennæ black; the tip of the second joint and the third joint sometimes red. Beard moderately abundant, white. Dorsum of thorax covered with nearly white pollen, the ground color in large part red, leaving the black as two median stripes and two large spots on each side, the one before, the other behind the suture, but obscured by the pollen. At other times the dorsum is almost wholly black in ground color with the humeri and post-alar callosities red; bristles mostly white; pleuræ thickly pollinose with whitish. Abdomen black, but densely, wholly, and evenly covered with nearly white pollen, or at th$_{e}$ mos with a faint shade of brownish. Oviduct shining. At times the ground-color on the posterior margins of the segments may be red and the oviduct may be shining red; hypopygium red. Legs usually dark red with the femora broadly black in front but somewhat variable, the tarsi often blackish.

Hab.—Mo., Kans.

A very common species on the Kansas Plains in July and August, where I collected about 40 specimens. Its large size and white pollinose abdomen will enable it to be recognized.

Proctacanthus rufus n. sp.

♀.— Length 30 mm. Front above scarcely narrowed, not much narrower than the distance between the eyes below, clothed with black hair and bristles throughout. Antennæ wholly red, broadly separated at the base, the basal joints with black hair. Ground color of front and face light red, the latter clothed wholly with nearly white hair. Pile of beard soft, nearly white, occipito-orbital bristles black and light yellow. Thorax deep red, the dorsum rich opaque reddish brown on the lateral margin slightly ochraceous pollinose, clothed in front with short black hairs, behind and on the scutellum with not very abundant black bristles the fan-like row of bristles in front of the scutellum black. Abdomen light opaque yellowish red, a little darker and shining on the terminal segments; first segment and narrow base of second black; wholly clothed with very short, sparse white pile, black hairs, and on the sides yellowish. Venter with long but sparse white pile. Front and middle coxæ with not abundant white hair. Legs deep red with black hair and bristles, the row of bristles below the front femora long Wings rather strongly tinged with brownish, veins nearly black.

Hab.—N. Carolina, Massachusetts.

Proctacanthus heros.

Asilus heros Wiedemann, Auss. Zw. Ins. i, 427, 3.

Proctacanthus heros Schiner, Vehr. Zool. Bot. Ver. xvi, 682; id. ibid., xvii, 396.

♀.—Length 38 mm. Front and face red, but chiefly concealed beneath yellowish gray pollen, mystax, hair of the front and the beard tinged with yellow, without intermixture of black. Face in profile below the antennæ rather strongly concave, on the lower half perpendicular and straight. First two joints of the

Digitized by Google

antennæ yellowish red, third joint reddish brown. Eyes convergent above, so that the distance between the upper angles is scarcely more than half of that between the lower angles. Thorax reddish brown, clothed on the dorsum in front with very short black hairs, behind and on the scutellum with rather abundant black hair and bristles. The very sparse pile of the pleuræ yellowish, the fan-like row of bristles in front of the halteres black. Base of the abdomen reddish black, becoming more reddish on the fourth and fifth segments; first segment wholly black haired, except on the posterior angles where it is brownish pollinose and yellowish haired; third and fourth segments similar, but the black hair successively less in extent and shorter, and the yellowish on the hind angles more extensive; fifth segment with the hair quite short and chiefly yellowish; sixth segment wholly with short yellow hair, the dust on the hind angles more whitish and the remainder of the segment reddish, except in the middle in front where it is a little blackish; seventh segment wholly white pollinose, except on the smooth posterior margins (broader in their middle) where it is light yellow. Hypopygium red with yellow hair. Venter wholly opaque ochraceous with rather abundant light yellow pile. Legs wholly yellowish red with black hair on the femora and yellowish on tibiæ, and rather short black bristles; the bristles on the under side of the front femora quite short and spine-like. Wings hyaline, very distinctly tinged with yellow along the veins. Veins yellowish red.

Hab.—Florida, Carolina. One specimen, Florida (Frazar).

Proctacanthus philadelphicus.

Proctacanthus philadelphicus Macquart, Dipt. Exot., 1, 2, 123, 7.

♂, ♀.—Length 26-29 mm. Front narrowed above, scarcely half as wide as the distance between the lower angles of the eyes. Face in profile moderately concave below the antennæ, not abruptly convex below the concavity, clothed with rather weak light yellow bristles, along the oral margin black; densely light yellowish pollinose. Antennæ black, the basal joints with short black and yellow hair; front with a few short black bristles on the ocelli; beard light yellowish white; occipito-orbital bristles in part black. Thorax reddish brown, opaque, dorsum in front clothed with short black hairs, behind and on the scutellum with moderately strong black bristles, the fan-like row of bristles in front of the halteres black. Abdomen black, not very broad at the base in the male, clothed with dense grayish ochraceous pollen, on the seventh segment more whitish, the terminal segments in the female shining black; on the sides of the second segment with numerous rather long black bristles; on the sides of the third with fewer and shorter ones, the strongest ones extending in a row inwards immediately in front of the smooth hind border; on the remaining segments fewer and shorter, and mostly confined to the row, as in the third; the hair is short, sparse, recumbent and yellowish white; hypopygium red with yellowish hair. Venter brownish red with short and abundant black and light colored pile. Front and middle coxæ with long hair in front like the beard. Legs red, the femora above in large part black; hair throughout yellowish white, the bristles black, on the under side of the front femora moderately long. Wing distinctly tinged with yellowish along the veins, the veins red.

Hab.—New England.

The ground color of the abdomen when wetted is distinctly red across the middle of the anterior segments, and the posterior segments wholly so; this explains Macquart's description.

Digitized by Google

OMMATIUS.

Ommatius tibialis.

Ommatius tibialis Say, J. Acad. Phil. iii, 49; Compl. Wr. ii, 63; Wiedemann, Auss. Zw. Ins. i, 422, 6; Williston, Trans. Amer. Ent. Soc. vol. xi, pl. 2. fig. 12.

♂.—Length 16 mm. Black. Eyes in life green. Face thickly covered with yellowish white pollen, the yellowish white mystax composed of hair, reaching thinly nearly to the antennæ. Antennæ black. Dorsum of thorax smooth, bare except the sparse and rather weak white bristles, with a broad black median stripe, separated by a line on each side from two large spots, the one in front, the other behind the suture; pleuræ densely, nearly white pollinose. Abdomen black, lightly pollinose on the sides and posterior parts of the segments, moderately contracted on the sides in the middle. Halteres light yellow. Wings hyaline, lightly blackish tinged on the outer part, on the exterior anterior part with a distinct yellowish tinge; costa strongly thickened and bent forwards beyond the tip of the auxilary vein. Legs chiefly yellow, but variable, the femora more or less black, the hind pair most so, sometimes almost wholly black, the front pair least so, sometimes almost wholly yellow, tips of the tibiæ, most especially the hind pair, which may be only yellow at the base; tarsi black, the front and middle pairs yellow at the base. In the female the costa of the wings is simple, not thickened or curved, otherwise as in the male.

Hab.—Penna, Conn., Mass.

Four specimens from New England. A greasy female from Georgia that I can not otherwise separate, has the legs, except the tip of the hind tarsi, wholly light yellowish red.

Digitized by Google

Notes on the systematic position of some North American LEPIDOPTERA.

BY JOHN B. SMITH.

Very regularly when specimens of *Eudryas* are sent to European collectors, word arrives that surely these insects are not *Zygaenids*. Moeschler and Snellen positively refer them to the *Noctuidae* and others are not less certain that their position among the *Zygaenidae* is erroneous, though less decided as to their proper systematic position. In 1854–1858 Dr. Herrich-Schaeffer in his magnificent work, the "Sammlung ausser-europaeischer Schmetterlinge," limits certain families of Lepidoptera, carefully defining their characters, and among others the *Zygaenids* are discussed. In 1862 Clemens, speaking of the same family says: "I am convinced that the limit of the family under consideration is much more restricted than is usually represented. It is made to include a variety of incongruent forms, which it is extremely difficult to unite under a common and satisfactory definition"

Had Dr. Clemens been acquainted with the insects at present classed as *Zygaenidae* in our catalogues and lists, he would have written "impossible," for "extremely difficult."

In 1864 Dr. A. S. Packard, Jr., in the Proceedings of the Essex Institute vol. iv, published his "Notes on the family *Zygaenidae*" in which he carefully compares the structural peculiarities of European and American genera. All the preceeding works on the group are noted, and among them Herrich-Schaeffer's "Sammlung." Dr. Packard regards this work with little favor, and evidently did not read the notes appended to the synopsis of families, else he would hardly have criticised the supposed arrangement of families, which Herrich-Schaeffer especially says is proposed merely for convenience of determination. The Herrich-Schaeffer system is largely based upon venation and his work is still followed by the German lepidopterists, and forms the basis of the arrangement in Staudinger's Catalogue of European Lepidoptera.

Dr. Packard gives very little weight to peculiarities of venation, and his idea of the family *Zygaenidae* embraces the greatest possible diversities in this respect to be found among the *heterocera*. His arrangement has, however, been acquiesced in by subsequent workers, and Mr. Grote's discussions of the family have added nothing to our knowledge of the group, save several new genera and species.

Digitized by Google

Mr. Stretch, too, has followed Dr. Packard implicitly. My own idea had long been, that the family was too heterogeneous; but as my studies had been more especially in the noctuidae I had contented myself with simply making occasional notes of observed peculiarities. The question of adopting *Eudryas* as a noctuid, forced upon me by the opinion of so good a Lepidopterist as Moeschler led me into an examination of some of the genera, and the result of this examination and of the accumulated notes is here given.

The European genus *Zygaena* which is admittedly the type of the family has 13 veins to primaries and 9 to the secondaries. *Ino* has 10 veins to the secondaries, three of them being "free" or internal veins. The primaries have two distinct free or internal veins, no accessory cell, and a somewhat constricted discal cell. The secondaries have an oblique branch connecting the costal and subcostal. Figure 23 of Plate III illustrates the venation of *Zygaena*. As stated, Dr. Packard seems to place little reliance upon venation, but gives great weight to the form of the head. This in *Zygaena* is broad, the front full, subquadrate; the eyes hemispherical. The antennae are situated midway between the eyes and the middle of the head and are therefore rather approximate. Immediately behind is a deep transverse fovea, at the extremes of which the minute ocelli are situated. Behind this is a broad divided ridge overshadowing the base of antennae. Figures 1, 5 and 9 of Plate III illustrate the structure. All the examined species of *Zygaena* agree in this head structure. *Ino* differs in having a normally smooth vertex and epicranium and very large, prominent ocelli. The situation of the antennae is as in *Zygaena*.

No American form referred to the *Zygaenidae* agrees with *Zygaena* in head structure, though *Cossus Robinae* makes some approach to it; and no North American genus examined agrees with either *Zygaena* or *Ino* in venation. The body structure of *Zygaena* and *Ino* practically agree and it is peculiar by the strong development of the prothorax. The pronotum is small, but distinctly visible, and the episterna are divided (see pl. III f. 13), a character not paralleled in any N. A. genus. It may be added here that the secondaries are frenate; in the ♂ a single stout bristle as usual, in the ♀ a bunch of 5 or more stiff hairs.

The genital armature of the ♂ is very simple, and very unlike that of the lower moths. The ordinarily strongly marked supra-anal plate with a well marked corneous hook is entirely wanting and only the broad spoon-shaped side pieces are developed (See pl. III f. 16 and 18).

Digitized by Google

The antennal structure in *Zygaena* is peculiar; the member is stout, dilated toward and obtusely terminated at tip.

Ino differs in having the antennae pectinated in the ♂. So strongly marked are the differences between *Zygaena* and *Ino* that it seems to me that distinct sub-families are indicated.

Pyromorpha H-Sch. most nearly agrees with the true *Zygaenidae* in venation of primaries—(compare figs. 23 and 24 pl. III) but differs very essentially in venation of secondaries, in which the costal vein is entirely wanting. The head structure is not unlike that of *Ino*, and the ocelli are large and prominent. The family *Pyromorphinae* H-Sch. as based on this genus is well founded, and should be recognized.

Harrisina Pack. is a much narrower winged insect and yet agrees in essential characters with *Pyromorpha*. It should be associated with it. *Acoloithus* Clem. very probably should be referred to the same family, but I have not been able to examine the species carefully. The antennae are not thickened but are lengthily pectinate in the ♂.

Several others of our genera lack the costal vein of secondaries, but differ very decidedly in other respects.

The *Syntomoidae* are defined by Herrich-Schaeffer as small butterflies with filiform antennae, long abdomen and short secondaries; ocelli wanting, tongue corneous. Primaries with one internal vein, 7–10 from the same stalk, a long distance between 5 and 6. Secondaries with five or six veins.

To this family, which differs so decidedly in venation from *Zygaena*, I would refer *Lycomorpha*, *Anatolmis*, *Cosmosoma* and probably *Syntomeida*.

Lycomorpha is unlike *Syntomis* in superficial appearance, but agrees in essential structural details. The secondaries lack the costal vein and have only one internal vein. The subcostal is furcate at the end of the cell, and the submedian is three branched. There are therefor but six veins. Dr. Packard figures the head structure, which is essentially like *Pyromorpha*, save that the ocelli are wanting. The genus is a peculiar one, with strong affinities to the *Lithosiids*.

Anatolmis is like *Naclia*, save that the ocelli are present. The secondaries are six veined, and in the primaries 6–9 are from one stalk. The genus is intermediate in structure between *Lycomorpha* and *Cosmosoma*.

Cosmosoma resembles *Syntomis* in having partially pellucid wings but differs by having the ocelli evident. I have been unable carefully to examine species of *Syntomis*, and am not in a position to make com-

Digitized by Google

parisons. The affinity of these forms with pellucid wings to the *Sesiidae* is marked by the internal vein of the primaries being very close to the margin (in *Sesia* it is absent) and by the absence of the costal vein of secondaries. In this genus the "independent" vein is feebly indicated in the secondaries, and they are thus 7 veined.

The family should follow the *Sesiidae*, forming through the genera *Lycomorpha* and *Anatolmis* the connection with the *Pyromorphidae* on the one hand, and the *Ctenuchidae* on the other.

The antennal structure in these genera agrees essentially with that of the *Pyromorphidae*, and they are very similarly placed.

Ctenucha and *Scepsis* agree essentially in structure. The secondaries lack the costal vein, but have two free, or internal veins, thus differing at once from the *Syntomoidae*. The venation of primaries takes a decided *Bombycid* or even *Noctuid* character, and the affinities to the *Arctiidae* are strongly marked. The larva sustains this view, and forms a strong argument against a union of *Ctenucha* with the *Zygaenidae*. A reference to the figures of Plate III will enable the student to make his own comparisons.

While I do not think the head structure entitled to nearly as much weight as Dr. Packard gives it, yet in all the genera hereinbefore discussed there is one element of head structure entitled to great weight, and that is the position of the antennæ. In the *Noctuidae* they are inserted close to the compound eyes and as far apart as the width of the head will allow. In the *Zygaenidae* and the above mentioned families they are situated midway between the compound eye and the centre of the head, and the basal joints are therefore contiguous. The ocelli, too, are situated at a distance from the compound eye, and from the base of antennæ, and are often unusually large and prominent. In the *Noctuidae* they are close to the compound eye and close to the base of antennæ so that in most cases they are easy discernible with a lens without denuding any portion of the head. No *Bombycid* genera have been compared, for that would have exceeded the purposes of this paper.

The families above discussed can be separated in tabular form so as to give a convenient comparative survey, as follows:

Primaries with two internal veins.
  Secondaries with costal vein connected with subcostal by an oblique branch; with two or three internal or free veins..... .....**Zygaenidae.**
  Secondaries without costal vein ....**Pyromorphidae.**
Primaries with a single internal vein; secondaries without costal vein.
  Secondaries with a single internal vein, and not more than a total of 7 veins. **Syntomoidae.**
  Secondaries with two internal veins; always with 8 veins.....**Ctenuchidae.**

Digitized by Google

Up to the present point there is no especial disagreement between the results of my study and those reached by Dr. Packard. I simply give a higher value to characters of venation, and believe, that judged according to the amount of variability shown in other groups that these families are well founded. It is further an advantage to have compact groups easily separable on defined characters, rather than a mass of genera and species absolutely incapable of definition.

As to the position of *Eudryas* and *Alypia* I am decidedly of opinion that their place is not with the *Zygaenidae* for there is hardly a structural feature common to *Alypia* and *Zygaena;* nor is their place with the *Castniares*. Further *Alypia* and *Eudryas* have so little in common, that I would refer them to distinct families. Plate III figures 3, 7, 10 and 27 illustrate *Alypia*, while 2, 6 and 11 illustrate *Eudryas*.

Dr. Packard's figures on Pl. 2, and accompanying his paper are somewhat misleading, and not entirely in accordance with the specimens examined by me. In the figure the front seems narrowing inferiorly, while on the contrary in those specimens examined by me the front narrows superiorly. In my plate the eyes are somewhat too large in fig. 3, but otherwise I believe the figures accurate. Dr. Packard's figure of the head of *Eudryas* makes the front too narrow, and in no specimen examined by me is there the central depression of the epicranium. *Alypia* is peculiar in head structure, especially by the form of the eyes. These consist of slightly convex disc so placed that from the front they have the normal appearance, but from the side or top (figs. 7 and 10) the essential difference between them and those of *Eudryas* and *Stiria* (figs. 6–8, 11 and 12) are quickly perceived. Between the facetted disc of the true eye, and the back of the head, is situated a broad velvety black piece which is not facetted. In no other form known to me is this structure found, the eyes usually occupying the entire side of the head. The clypeal structure affords nothing not paralleled in the *Noctuidae*. The antennæ are rather close together at base but this is rather the result of the narrowness of the head than of any peculiarity of position. Yet they show a *Zygaenid* tendency in not being entirely close to the compound eyes. The antennæ are rather elongate slightly thickened toward the middle, but rather acutely terminated. The thoracic structure differs from *Zygaena* in the poorly developed prothorax; the pronotum is not visible at all, from above, and the episterna are single. A comparison of figures 13 and 14 on Plate III will illustrate the differences. Except the structure of the prothorax there is nothing in the difference of thoracic structure not parallel in the *Noctuidae*. In *Eudryas* the body structure is essen-

Digitized by Google

tially as in *Alypia*. The neuration of *Eudryas* and *Alypia* agrees essentially, and except in one point is like the typical *Noctuid*, and as far as it is possible to be from that of the typical *Zygaenid*. If any value at all is to be accorded to venation in classification it is utterly impossible that *Zygaena* and *Alypia* can remain in the same family. A comparison of figures 23 and 27 will explain better than any lengthy description. The presence of an accessory cell, the distribution of veins therefrom and the number and arrangement of veins of secondaries; all are distinctively noctuiform. The only difference is that the internal vein of primaries is not furcate at base. This character keeps *Alypia* and *Eudryas* out of the *Noctuidae*. The difference is illustrated in figures 21 (*Eudryas*) and 22 (*Noctua*). The structure of the frenae of the ♀ *Zygaena* has been noted. *Alypia* and *Eudryas* have in the ♀ two or three well defined spines, very different from the bunch of stiff hair found in *Zygaena*. To this character I am inclined to attribute considerable importance, because it is one which varies little or not at all in any group in which it is present. Mr. Hulst informs me that some *Notodontids* and *Geometridae* are like *Zygaena* in this respect.

The structure of the ♂ genitalia is very different from that of *Zygaena* and the difference is not one of degree but of kind. The supra anal plate is present, is corneous, triangular, and produced into a cylindric curved hook (Pl. 3, f. 20). This is a character distinctly marked in all the *Noctuidae* and such of the *Bombycidae* as I have examined, and is distinct in the *Sphingidae*. The *Hesperids* are not unlike *Zygaena* in this respect. The side pieces are semi-chitinous, thickened and somewhat curved. (Pl. III, f. 17). This structure is certainly entitled to great weight in classification and should authorize the exclusion of *Alypia* from the family in which *Zygaena* is placed. The only *Zygaenoid* feature in the genus is the antennal structure, and even this is very unlike the genus *Zygaena*. These members have been already described, and their only departure from the normal *Noctuid* type is the slight thickening toward the middle. This is not equally prominent in all species, and in itself is not a controlling character, since in *Zygaena* even as restricted some of the species have more or less filiform antennæ.

Alypia is much more nearly allied to *Noctua* than to *Zygaena* but is entitled to family rank, its position being intermediate between the *Arctiids*, and *Noctuids*, with affinities toward the *Zygaenidae*. The distinguishing features of the family are the thickened antennæ and the lenticular eyes, which do not occupy the entire side of the head.

Digitized by Google

Eudryas is still less *Zygaenoid* in structure than is *Alypia*. Under the term *Eudryas* I include as well *Ciris* and *Copidryas*, not because I consider them synonyms, but because they seem to agree in essential family structure. The head structure is essentially *noctuiform*, and less like *Zygaena* than *Alypia*. The antennæ are more *noctuidous*, those of *Ciris* being bipectinate in true *Bombycid* fashion. The body structure differs in nothing from the *Bombycidae* or *Noctuidae*, and does differ from that of *Zygaena*. In the character of the ♂ genital pieces the genus is still more decidedly *noctuidous* than *Alypia*. The supra anal plate is present, much as in *Alypia*, but the hook-like projection is not cylindrical but flattened and somewhat spatulate (Plate III, fig. 19). The side pieces are membranous, arcuate, and somewhat incurved toward tip. Near the base of the side piece arises the corneous or chitinous clasper, which is longitudinally grooved, furnished with a trigonate inferior projection near middle, and furcate toward tip. Figure 15 of the plate gives a better idea of the structure than any description can do. This structure thoroughly agrees with that of the *Noctuidae*, or of the noctuiform *Bombycids*, and is very different from both *Alypia* and *Zygaena*. Altogether this insect is structurally as widely separated from *Zygaena*, as the *Bombycidae* are from the *Noctuidae*—nay further, because these families agree more nearly in body structure and in venation, than do those genera placed into the *Zygaenidae*.

The true position of *Eudryas* is, it seems to me, very close to where Harris put it—*i. e.* allied to *Datana* and the *Notodontids*. The wing form, the body vestiture, the elongate abdomen, the metallic scales, tufted legs; all are *Bombycid* characters which cannot possibly be disregarded in any reasonable classification. Though the larva are so nearly alike that they are scarcely to be distinguished except by careful comparison, yet I do not believe that *Alypia* and *Eudryas* are closely allied, and favor their separation, giving them place in distinct families.

In Mr. Meyer's grand collection of South American insects the *Castniares* are largely represented; and, though I made only the most casual comparisons, yet I am firmly of opinion that neither *Eudryas* nor *Alypia* can remain associated with them.

Of the other genera found under the general head *Zygaenidae* in Mr. Grote's catalogue, *Gnophaela* belongs to that "debatable ground" between the *Lithosiidae* and the *Arctiidae*. The venation is *Lithosiid*. *Cydosia* I have not examined. *Penthetria* is a composite genus, apparently containing heterogeneous forms. *Triprocris* has not been under examination, nor have *Horama* and *Laemocharis*. *Pseudalypia* I have not seen

Digitized by Google

in nature, and *Edwardsia* has been only superficially viewed. *Psychomorpha* I have had no specimens of that I could denude, but it seems close to *Alypia*.

No exotic material has been compared except as above stated, because it was not intended to do more than separate into compact, easily definable groups that composite mass termed in our lists *Zygaenidae*.

To resume, my arrangement of the genera here discussed would be provisionally as follows:

Zygaenidae not represented.

Syntomoidae *Didasys* Grt., *Cosmosoma* Hb., *Syntomeida* Harr., *Anatolmis* Pack., *Lycomorpha* Harr., *Horama* Hb. (?), *Laemocharis* H. S. (?)

Pyromorphidae *Pyromorpha* H. S., *Harrisina* Pack., *Triprocris* Grt.

Ctenuchidae *Ctenucha* Kirby, *Scepsis* Walk.

Alypiidae *Alypia* Hb., *Pseudalypia* Hy. Edw. (?), *Edwardsia* Neum. (?), *Psychomorpha* Harr.

Eudryas and allies find a place in the *Bombycidae*.

EXPLANATION OF PLATE III.

1.—Front view; head of *Zygaena*.
2.—Front view; head of *Eudryas*.
3.—Front view; head of *Alypia*.
4.—Front view; head of *Stiria*.
5.—View from above; head of *Zygaena*.
6.—View from above; head of *Eudryas*.
7.—View from above; head of *Alypia*.
8.—View from above; head of *Stiria*.
9.—Side view; head of *Zygaena*.
10.—Side view; head of *Alypia*.
11.—Side view; head of *Eudryas*.
12.—Side view; head of *Stiria*.
13.—Thoracic structure of *Zygaena*.
14.—Thoracic structure of *Alypia*.
15.—Side piece and clasper of *Eudryas*.
16.—Side piece of *Zygaena*.
17.—Side piece of *Alypia*.
18.—Genitalia of *Zygaena* from below.
19.—Supra anal hook of *Eudryas*.
20.—Supra anal hook of *Alypia*.
21.—Distribution of veins reaching base in *Eudryas*.
22.—Distribution of veins reaching base in *Noctuidae*.
23.—Venation of *Zygaena*.
24.—Venation of *Pyromorpha*.
25.—Venation of *Cosmosoma*.
26.—Venation of *Ctenucha*.
27.—Venation of *Alypia*.

Digitized by Google

A study of the species of CRYPTOBIUM of North America.

BY GEORGE H. HORN, M. D.

The following study was begun with the intention of presenting the observations regarding the variability of the males in their secondary sexual characters, with the expectation that those fortunate enough to possess large series would be enabled to re-arrange their material. Fearing that the hints given might result in greater confusion than benefit without applying them directly to the species, it has been thought a advisable to extend the work making the study complete.

Fortunately the typical material described by Dr. LeConte has been before me at the time of the preparation of the work and this, with my own more ample material, supplemented by that of Mr. H. Ulke, leaves nothing to be desired in the study of the more difficult forms.

It is to be regretted that the use of the table in series A pre-supposes the possession of the two sexes. This is, however, unavoidable, but the difficulty is not entirely insurmountable.

———o———

Having acquired a large number of specimens of Cryptobium from Texas and Arizona I noticed some sexual peculiarities which seem to have escaped observation in species from other regions. That variations similar to those about to be described do occur is rendered probable from a few words by Dr. Sharp regarding the modification of the lobe of the fourth ventral segment (Trans. Ent. Soc. London, 1876, p. 210) in the Amazon species.

As far as the species in our fauna are concerned it may be stated that under all circumstances it is the males that have a plica or fovea on both the third* and fourth ventral segments. The females have at most a plica or fovea on the third segment, but never on the fourth, and in by far the large majority of species the ventral segments in the female are absolutely simple.

There is no dilatation of the anterior tarsi of the male, and the two sexes here precisely agree.

* It must be borne in mind that the *first* ventral is concealed under the coxæ, and the true second is the first visible segment. This method of numbering the segments will prevail in the following pages.

Digitized by Google

The sexual peculiarity most numerously observed among the Staphylididæ, after the dilated tarsi, is some form of emargination or incisure of the seventh ♂ ventral segment. This is observed in about half of our Cryptobium.

As the species now stand recorded the following have the seventh ♂ ventral incised or emarginate: *sellatum*, *californicum*, *flavicorne*, *tumidum*, *pallipes*, *latebricola*, *cribratum*, *serpentinum*, *prospiciens*, *pusillum* and *lepidum*. The form of the incisure varies, and will be more fully explained under the different species.

In the other species not enumerated the seventh ventral is absolutely simple and alike in the two sexes. These, however, have a special character in fully developed males consisting of a prolongation of the middle of the fourth segment in the form of a lobe extending at times beyond the posterior margin of the fifth ventral. This lobe may be either broad and obtuse at tip or narrow and quite acute according to the species. The first variation observed in this lobe is in a specimen of *arizonense*, in which the tip is truncate, and the lobe shorter than the fifth ventral. From this the lobe becomes gradually shorter, losing the long fimbriae, until it becomes barely perceptible in the hind margin of the segment being a little more arcuate. The lobe, in fact, finally disappears entirely. Full series of at least six of our species are before me illustrating the shortening and final disappearance of the lobe, nothing remaining to distinguish the specimens as males excepting the plica or fovea on *both* the third and fourth segments. We have, therefore, among these species a true sexual polymorphism in the males which would be very confusing and lead to an undue multiplication of species without large series were at hand.

Near the posterior margin of the third ventral of the male we observe a short transverse plica bearing short erect setae. In several species the plica is reduced to a simple puncture as in *ventrale*. On the fourth ventral there is usually a puncture sometimes large and deep as in *pimerianum*, or small as in the greater number of species. Rarely the transvere plica is well marked on both segments.

As a general rule the size of the head gives no indication of the sex. Males with a well developed ventral lobe have a larger head than the females, while those males with a short or no lobe are not in any respect different from the females in the form of the head.

The seventh ventral is always simple in the female, and in but few species do we observe a plica, and then on the third segment only.

Digitized by Google

In several species, owing probably to the small number of specimens, it is not possible to assert with certainty that they have the fourth ventral lobed in the male. They have, however, the seventh ventral simple, the third and fourth foveate or plicate, and by inference they too are like the others of the series to which they belong.

In one species (*prospiciens*) it will be observed that the seventh ventral of the male is broadly triangularly emarginate and the fourth ventral lobed. We have thus the chief characters defining two groups united in one species.

In all the species there will be observed on the side of the head behind the eyes a fovea in and around which the punctures are denser. Those species with the head decidedly narrower behind the eyes have but little trace of the fovea.

In order that the various sexual differences above recorded may be more accurately described, and the species better defined, it is proposed to divide our species into three series, as follows:

Last ventral segment ♂ simple.....SERIES **A.**
Last ventral segment ♂ emarginate or incised.
Fourth ventral segment ♂ lobed.....SERIES **B.**
Fourth ventral segment ♂ simple.....SERIES **C.**

SERIES A.

The essential character of this series consists in the simple terminal ♂ ventral segment. It is also to be observed that the fully developed males have the fourth segment prolonged in a lobe variable in width and length not only between different species but also between males of the same species. All the males have either a puncture or short transverse plica at the middle of both the third and fourth segments. The females have usually an entirely simple venter, four species only as far as known to me have a plica on the third segment alone.

In consequence of the variability of the males I have thought it advisable to describe the forms separately, and I have accordingly improvised three terms to indicate them:

Complete form is that in which the lobe of the fourth ventral is fully developed.

Incomplete form that in which the lobe is abbreviated.

Imperfect form that in which the fourth segment is truncate posteriorly without trace of lobe.

Of these three forms the most abundant is the complete form, nearly as numerous are the imperfect males, while the incomplete males are far less common.

Digitized by Google

In four species the *imperfect form* of the male has alone been seen (*floridanum*, *anceps*, *lugubre* and *obliquum*) and from the fact that the *complete form* is very much more abundant than either of the others in the species in which it occurs, it is possible that those above enumerated have no other form of male.

Reasoning deductively we might be safe in asserting that what is mentioned above as a supposition is a fact. If we except this as true then we have all the probable combinations of the foveae, lobe and emargination in the males and our series of species may be considered structurally a perfect one.

The following table will enable our species to be separated:

Third ventral segment ♀ with a fovea or short transverse plica very near its centre .....2.
Third ventral ♀ absolutely simple.....4.
2.—Abdomen of uniform color, brown or piceous.....3.
Abdomen bicolored, piceous with last two segments rufo-testaceous; meso-metathorax piceous.....7. **bicolor.**
3.—Third and fourth ventral segments ♂ each with a well-marked transverse plica.....2. **floridanum.**
Third segment with a plica, fourth with a puncture.
Head not conspicuously coarsely punctured, punctures of elytra close and confused; third joint of antennæ conspicuously longer than the second. Larger species .40–.60 inch.....1. **badium.**
Head relatively coarsely punctured, punctures of elytra coarse, and in distinct striæ; third joint of antennæ not longer than second. Small species .26 inch.....5. **lugubre.**
4.—Abdomen bicolored.
Last two segments paler.
Meso-metathorax and head rufo-testaceous.....9. **texanum.**
Meso-metathorax and head piceous.....8. **carolinum.**
Last two segments piceous, the others rufo-testaceous.....14. **vittatum.**
Abdomen uniform in color, brownish testaceous, piceous or almost black.....5.
5.—Head gradually narrowed behind the eyes, the hind angles scarcely evident; elytral punctures substriate .....6. **obliquum.**
Head parallel behind the eyes, the angles broadly rounded; punctures of elytra confused.....6.
6.—Abdomen piceous .....7.
Abdomen rufo-testaceous not differing from the thorax and elytra.....8.
7.—Entire body above and beneath piceous, almost black.
Head opaque, moderately densely punctured; elytra densely punctured. Species small .28–.30 inch.....4. **despectum.**
Head shining, rather sparsely punctured; elytra coarsely not densely punctured. Species large and robust .44 inch .....3. **anceps.**
Head, thorax and elytra rufo-testaceous or pale castaneous.
Surface shining punctuation of head and thorax normally distinct, that of the abdomen very indistinct.....15. **ventrale.**
Surface subopaque, punctuation of thorax feeble, that of the abdomen rather coarse and distinct.....11. **vagum.**

Digitized by Google

8.—Head always darker than the thorax and elytra, punctuation of abdomen above very evident.

Species smaller, more slender and convex, fovea of fourth ventral ♂ not very large..... .....10. **Lecontei.**

Species larger, more depressed, fovea of fourth ventral ♂ conspicuously large.....12. **pimerianum.**

Head, thorax and elytra rufo-testaceous or pale castaneous; punctuation of abdomen almost obsolete; fovea of fourth ventral ♂ small, often punctiform. 13. **arizonense.**

1. C. badium Grav.—Uniformly brown in color, either darker or paler, head usually slightly darker. Antennæ pale brown, nearly as long as the head and thorax, third joint conspicuously longer than the second. Head shining, oval sometimes broadly, sides nearly parallel, posteriorly suddenly constricted, surface not conspicuously coarsely punctured, the punctures not close except at the sides, front very sparsely punctured. Thorax about one-fourth longer than wide, sides very feebly arcuate, median smooth space well defined, on each side of which the punctures are coarse and numerous, a little less closely placed near the base and front angles. Elytra a little longer and one-half wider than the thorax, a little longer than wide conjointly, surface rather coarsely and deeply punctured the punctures close but not dense. Abdomen above comparatively finely and sparsely punctured, beneath a little more coarsely punctured, shining. Legs pale rufo-testaceous. Length .40–.50 inch; 12.5 mm.

Male (*Complete form*).—Third ventral segment furnished at middle with a moderately long, slightly elevated transverse plica setose posteriorly; fourth ventral prolonged at middle in the form of a lobe with parallel sides and obtusely rounded tip, extending to the middle of the sixth segment, bearing long fimbriæ from the margin and lower surface; at the middle of the segment is a large puncture bearing short setæ. Last ventral segment entire (Pl. 1, fig. 1).

Male (*Imperfect form*).—Fourth ventral without any trace of the prolongation, the plica of the third and fovea of the fourth as in the perfect form (Pl. 1, fig. 2).

Female.—Third ventral segment with a short setigerous plica at middle (Pl. 1, fig. 3).

This species being so common and generally well known, forms with *bicolor*, convenient points of comparison for less known species.

Very little variation is observed in *badium* beyond the change of color from dark to lighter. As a general rule the males have longer and broader heads than the females, but this is by no means constant.

Occurs from Canada to Florida, westward to Nebraska and N. Mexico.

2. C. floridanum Lec.—Piceous, shining, sparsely pubescent. Antennæ brown, two basal joints paler, nearly as long as the head and thorax, third joint longer than the second. Head oval, hind angles broadly rounded, sides slightly arcuate, surface shining, moderately coarsely punctured, the punctures denser at the sides and very sparse on the front. Thorax about one-fourth longer than wide, narrower than the head, sides nearly parallel, median smooth space well defined, on each side of which the punctures are numerous, coarse and deep, arranged as in *badium*. Elytra one-third wider than the thorax and longer, longer than wide conjointly, surface coarsely and deeply punctured, the punctures closer and more

Digitized by Google

numerous than in *badium*. Abdomen above and beneath a little more coarsely punctured than in *badium*. Legs yellowish testaceous. Length .38–.44 inch; 9.5–11 mm.

Male (*Complete form*).—Unknown.

Male (*Imperfect form*).—Third and fourth ventral segments each with a short transverse plica at middle, bearing short setæ. Last ventral entire, subtruncate (Pl. 1, fig. 4).

Female.—Third ventral segment with a short transverse plica at middle, fourth simple (Pl. 1, fig. 5).

Of this species I have examined 2 ♂, 3 ♀. The males are exactly alike in their sexual characters, none have been seen with the fourth ventral lobed. It may be possible that this species *lugubre* and *anceps* do not possess males with the lobed fourth ventral.

In its general appearance *floridanum* resembles *pallipes*, but its facies is more slender and the sexual characters will readily distinguish it.

The type described by Dr. LeConte is before me, and having both sexes in my own cabinet it may be asserted that his specimen is a male and not a female as stated.

Occurs in Florida and Louisiana.

3. C. anceps n. sp.—Form rather robust, black, shining, sparsely pubescent, abdomen piceous. Antennæ rufo-testaceous, not as long as the head and thorax, third joint conspicuously longer than the second. Head large, almost equal in area to the elytra, surface feebly shining, not conspicuously coarsely punctured, the punctures not close, nearly as in *badium*, front smoother and with a distinct fovea. Thorax narrower than the head, about one-fourth longer than wide, sides nearly parallel, median smooth space well defined, on each side of which the punctures are coarse and deep, closely placed in front, and more sparse posteriorly and at the sides. Elytra about one-fourth wider than the thorax and longer, longer than wide conjointly, the punctuation coarse, deep and close. Abdomen above and beneath with the punctuation relatively fine and sparse. Legs pale rufo-testaceous. Length .44 inch; 11 mm.

Male (*Incomplete form*).—Third and fourth ventral segments each with a small transverse plica at middle, almost punctiform. Last ventral entire (Pl. 1, fig. 6).

Female, not known.

Of this species two males of the form described above are known to me. The female being unknown, it is impossible to assign it a place with certainty in a synoptic table. I have ventured, however, to place it as if that sex had an entirely simple abdomen.

In facies the species resembles *pallipes* and *floridanum*, but is more robust and has a larger head.

Two specimens ♂, Arizona. Morrison.

4. C. despectum Lec.—Piceous, feebly shining, very sparsely pubescent. Antennæ slender, nearly as long as the head and thorax, brown, two basal joints paler, third joint longer than second. Head oval, suddenly constricted behind, hind angles rounded, surface subopaque, moderately densely and finely punctured,

Digitized by Google

front smoother. Thorax a little narrower than the head, one-fourth longer than wide, sides nearly parallel, median smooth space well defined, on each side of which the punctures are moderately fine and dense, sparser near the sides. Elytra a little wider than the thorax and slightly longer, black, subopaque, apical border narrowly yellow, surface densely punctured, the punctures finer than those of the thorax and coarser than of the head. Abdomen sparsely punctured, the punctures equalling those of the head. Legs yellowish testaceous. Length .28 inch; 7 mm.

Male (*Complete form*).—Third ventral with a moderately long setigerous plica at middle, fourth with a similar plica and prolonged in a lobe at its posterior border very broad at base and reaching the middle of the sixth segment; last ventral entire (Pl. 1, fig. 7).

Male (*Imperfect form*).—Fourth ventral not lobed, but squarely truncate, the third and fourth segments plicate at middle as above. (Cab. LeC.)

Female.—Third and fourth ventral segments simple, without fovea or plica.

At first glance this species recalls some forms of *Cafius*. Among the species of the present genus it can only be compared with *pallipes*, from which it differs in too many particulars to require special note.

I have seen two complete males, two imperfect males and three females.

Occurs in Louisiana and Florida.

5. C. lugubre Lec.—Form slender, entirely piceous or nearly black, shining, sparsely pubescent. Antennæ shorter than the head and thorax, rufo-testaceous, joints 3–6 darker, the third not longer than the second. Head oval, suddenly constricted at base, hind angles rounded, sides parallel, surface coarsely and sparsely punctured. Thorax very little narrower than the head, one-fourth longer than wide, sides nearly parallel, median smooth space well defined, on each side of which the punctures are large and deep, but not numerous. Elytra scarcely wider than the thorax and equal in length, with very coarse and deep punctures substriately arranged. Abdomen above and beneath relatively coarsely and sparsely punctured. Legs yellowish testaceous. Length .26 inch; 6.5 mm.

Male (*Imperfect form*).—Third ventral segment bearing a transverse setigerous plica at middle, fourth segment with a small fovea; seventh ventral entire (Pl. 1, fig. 8).

Female.—Third ventral with a very short plica almost fovea like in form; smooth ventral entire (Pl. 1, fig. 9).

The only variation observed in the nine specimens before me is that some are slightly paler in color, varying, however, less than *badium*. I have seen but two males as above; it may be possible that the form with fourth ventral lobed does not exist.

Occurs in Florida. Hubbard and Schwarz.

6. C. obliquum Lec.—Piceous, nearly black, shining, very sparsely pubescent. Antennæ shorter than the head and thorax, yellowish testaceous, second and third joints nearly equal. Head oval, sides obliquely narrowing behind the eyes, hind angles scarcely evident, surface shining, very sparsely punctate. Thorax a little narrower than the head, scarcely one-fourth longer than wide, disc more convex than usual, median smooth space well defined, on each side of which the

Digitized by Google

punctures are very coarse and deep, sparsely placed. Elytra a little wider and one-fourth longer than the thorax, the punctuation coarse and deep, substriately arranged near the base, confused at apex. Abdomen coarsely but sparsely punctured, the intermediate space very finely alutaceous. Legs yellowish testaceous. Length .24–.26 inch; 6–6.5 mm.

Male (*Complete form*).—Third segment with a very short setigerous plica; fourth segment with an almost obsolete fovea at middle, prolonged at middle posteriorly, in a narrow triangular lobe attaining the sixth segment: last ventral entire.

Male (*Imperfect form*).—Third ventral with a short setigerous plica, fourth not lobed behind but with a small fovea at middle (Pl. 1, fig. 10).

Female.—Ventral segments without fovea or plica, the terminal entire.

The form of the head and its sparse punctuation will serve to distinguish this species from any in the group in which it is placed. The only other species with this form of head are of large size and different coloration.

I have seen but four specimens; the two males described are in LeConte's cabinet, the females (*parcum* Lec.) are one in each cabinet.

Florida. Hubbard and Schwarz.

7. C. bicolor Grav.—Piceous, shining, thorax, elytra and last two ventral segments rufo-testaceous. Antennæ shorter than the head and thorax, rufo-testaceous, third joint longer than the second. Head black, shining, coarsely not densely punctured except at the sides, front smoother, form oblong-oval, very rarely with the sides of the head slightly oblique. Thorax narrower than the head, scarcely more than a fourth longer than wide, sides nearly parallel, median smooth space well defined, close to which the punctuation is coarse and close, near the base and at the sides much sparser. Elytra about one-third wider than the thorax and distinctly longer, the punctuation coarse and deep, close but not dense, irregularly arranged. Abdomen sparsely and comparatively finely punctured. Legs pale rufo-testaceous. Length .30–.40 inch; 7.5–10 mm.

Male (*Complete form*).—Third ventral with a short, median, transverse, setigerous plica; fourth segment prolonged posteriorly in a lobe with parallel sides and rounded tip, passing the posterior margin of the fifth segment, at middle a fovea of moderate size; last ventral entire (Pl. 1, fig. 11).

Male (*Incomplete form*).—Lobe of fourth ventral extremely short indicated merely by the posterior margin being more arcuate at middle; the plica of the third segment as above, the fovea of the fourth larger than the complete form (Pl. 1, fig. 12).

Male (*Imperfect form*).—Plica and fovea as in the incomplete form; fourth ventral truncate behind without trace of lobe (Pl. 1, fig. 13).

Female.—Third ventral at middle with a fovea of moderate size and rather transverse (Pl. 1, fig. 14).

In color the species seems wonderfully constant, and immature specimens, with the black head rendered thereby more conspicuous, have been described as *melanocephalum*.

Occurs from Michigan to Georgia and Texas, and as far west as Neb.

8. C. carolinum Er.—Piceous, moderately shining, thorax, elytra and last two ventral segments rufo-piceous. Antennæ a little shorter than the head and

Digitized by Google

thorax, brownish, two basal joints paler, third joint distinctly longer than the second. Head rather broadly oval, as wide as the elytra, black, shining, the punctuation coarse not dense, front much smoother, usually a large vertical puncture. Thorax narrower than the head, scarcely a fourth longer than wide, the median smooth space distinct, the punctures coarse, deep and numerous, and quite regularly placed. Elytra scarcely a fourth wider than the thorax but distinctly longer, punctuation coarse and deep, closely not densely placed, and in some specimens substriate near the suture. Abdomen coarsely not closely punctate. Legs testaceous. Length .34–.42 inch; 8.5–10.5 mm.

Male (*Complete form*).—Third ventral segment with a very short plica at centre; fourth ventral with a moderately large fovea, the posterior margin prolonged in a rather broad obtuse lobe which does not extend beyond the fifth ventral; last ventral entire (Pl. 1, fig. 15).

Male (*Incomplete form*).—Third ventral plicate, fourth with a fovea, the posterior margin of the fourth prolonged in a very short lobe.

Male (*Imperfect form*).—Third and fourth ventrals with the plica and fovea as above, the fourth truncate posteriorly without trace of lobe (Pl. 1, fig. 16).

Female.—Ventral segments simple, without plica or fovea.

In general appearance this species is intermediate between *badium* and *bicolor*. The head is dark as in these two species, and more broadly oval than in *badium*, which occupies really an intermediate position in this respect between *bicolor* and *carolinum*. The last two abdominal segments are pale as in *bicolor*, but much less conspicuously so, in fact in some specimens gradually paler to tip. When both sexes are present it may be known from either of the above species by the simple abdomen of the female. The male is never as fully developed in its ventral lobe as the above species, but this character cannot be used from the variability of the males of all the species of this series. In the table it is placed next to *texanum*, from which it is readily known by its large black head.

Taken rather abundantly in the District of Columbia by Mr. H. Ulke.

9. C. texanum Lec.—Pale castaneous, moderately shining, four basal segments alone piceous. Antennæ rufo-testaceous, shorter than the head and thorax, third joint distinctly longer than second. Head oval, hind angles gradually rounded, surface moderately coarsely not closely punctured, front smoother. Thorax narrower than the head, barely a fourth longer than wide, sides nearly parallel, median smooth space well defined, on each side the punctures are coarse and deep, closely placed along the smooth space and at apex, sparsely at the sides and posteriorly. Elytra one-third wider and slightly longer than the thorax, usually with a darker space along the suture widest at base, punctures coarse and deep, a little closer than in *bicolor* with the spaces between them less elevated. Abdomen rather sparsely finely punctured. Legs rufo-testaceous. Length .32–.44 inch; 8–11 mm.

Male (*Complete form*).—Third ventral with a short setigerous plica at its centre; fourth ventral with a large and deep fovea at centre, the posterior margin of the segment prolonged in a lobe as in *bicolor*; last ventral entire (Pl. 1, fig. 20).

Digitized by Google

Male (*Incomplete form*).—Third and fourth ventrals with the plica and fovea as above, the fourth with a very short lobe from its posterior margin (Pl. 1, fig. 21).

Male (*Imperfect form*).—Third and fourth ventrals with the normal plica and fovea, fourth ventral truncate posteriorly (Pl. 1, fig. 22).

Female.—Third and fourth ventral segments simple; last ventral entire.

This species closely resembles *bicolor*, and might readily be mistaken for a variety of it. The head is similar in color to the thorax and elytra. In *bicolor* the meso-metathorax is piceous in all the specimens I have seen, in *texanum* rufo-testaceous. The punctuation of the elytra, although nearly as coarse, causes the entire surface to appear less irregular than in *bicolor*.

Eight specimens, five ♂ three ♀, have been examined, they are from southwestern Texas.

10. C. Leconteï (*carolinum* Lec.).—Castaneous, shining, head piceous, very sparsely pubescent. Antennæ shorter than the head and thorax, rufo-testaceous, third joint slightly longer than the second. Head oval, sides parallel, hind angles gradually rounded, surface feebly shining, moderately coarsely and rather closely punctate, front smoother. Thorax narrower than the head, about one-fourth longer than wide, median smooth space well defined, on each side of which the punctures are coarse, deep and closely placed, but distant near the lateral margin. Elytra one-third wider than the thorax and slightly longer, the punctuation coarse, moderately deep, closely and regularly placed. Abdomen moderately coarsely and sparsely punctured, the punctures finer than on the head. Legs rufo-testaceous. Length .34–.38 inch; 8.5–9.5 mm.

Male (*Complete form*).—Third ventral with moderately long, distinctly elevated setigerous plica at centre; fourth with a moderate fovea at centre, the posterior margin prolonged at middle in a lobe which reaches the middle of the sixth segment, the base broad, the sides convergent, the apex broad and obtuse: seventh ventral entire (Pl. 1, fig. 17).

Male (*Incomplete form*).—Third and fourth ventrals plicate and foveate as above, the lobe of the fourth very short, barely reaching the middle of the fifth segment (Pl. 1, fig. 18).

Male (*Imperfect form*).—Third and fourth ventrals with normal plica and fovea, the fourth ventral truncate posteriorly without trace of lobe (Pl. 1, fig. 19).

Female.—Ventral segments absolutely simple without trace of plica or fovea.

Although this species is placed in the series following *bicolor*, resembles *badium*, although more slender and smaller. The males are also difficult to distinguish except by comparison, those of the present species will be observed to have the thorax more numerously punctured, the punctures of the elytra less coarse, closer and more regular. The color of the abdomen will readily distinguish it from either *bicolor* or *texanum*.

This species has been determined by Dr. LeConte to be *carolinum* Erichs., but I think incorrectly.

Occurs in southwestern Texas and Kansas.

Digitized by Google

11. C. vagum n. sp.—Form slender, body beneath and abdomen piceous, head, thorax and elytra pale castaneous or rufo-testaceous, very feebly shining. Antennæ rufo-testaceous, a little shorter than the head and thorax, third joint slightly longer than the second. Head oval, sides parallel, hind angles broadly rounded, surface subopaque, finely alutaceous, sparsely punctate at middle, more densely at the sides. Thorax narrower than the head, one-fourth longer than wide, sides feebly arcuate, surface subopaque, finely alutaceous, median smooth space well defined, the punctures at the sides moderate not deep, regularly sparsely placed. Elytra one-third wider than the thorax and distinctly longer, the surface somewhat more shining than the head and thorax, the punctuation moderate in size not deep, very regularly placed. Abdomen a little more shining, sparsely finely punctate. Legs pale yellowish testaceous. Length .28–.32 inch; 7–8 mm.

Male (*Complete form*).—Third ventral with a short transverse plica at centre; fourth with a moderate fovea at centre, the hind margin prolonged at middle in a lobe extending to the posterior margin of the fifth segment, the sides convergent, base of the lobe nearly as broad as its length; seventh ventral entire (Pl. 1, fig. 23).

Male (*Incomplete form*).—Third and fourth ventrals with the fovea and plica as above, the lobe of the fourth very short barely reaching the middle of the fifth segment (Pl. 1, fig. 24).

Male (*Imperfect form*).—Third and fourth ventrals with a smaller plica and fovea, the hind margin truncate without trace of lobe (Pl. 1, fig. 25).

Female.—Ventral segments simple without trace of plica or fovea.

This species although placed next *ventrale* in the table is very little related except in color. It is smaller, more slender, less depressed. In general appearance it seems more nearly part of the series which precedes it. It may be known by the want of lustre of the head and thorax, and by the punctuation of the latter less decided and apparently with a tendency to become obsolete.

Occurs in southwestern Texas; eighteen specimens examined.

12. C. pimerianum Lec.—Pale brown, moderately shining, very sparsely pubescent, head piceous. Antennæ shorter than the head and thorax, brown, two basal joints paler, third slightly longer than second. Head rather broadly oval, sides parallel, hind angles broadly rounded, surface less shining than the thorax, the punctuation moderate and rather close, the front smoother. Thorax narrower than the head, scarcely more than a fifth longer than wide, sides slightly arcuate, median smooth space well defined, on each side the punctures are coarse, moderately deep not closely placed but equally disposed. Elytra one-fourth wider than the thorax and distinctly longer, the punctuation coarse and deep, closely not densely placed. Abdomen distinctly punctured and (in comparison with the usual punctuation) rather coarse and close. Legs rufo-testaceous. Length .34–.44 inch; 8.5–11 mm.

Male (*Complete form*).—Third ventral with a short but well elevated plica at centre; fourth with a large fovea, the posterior margin prolonged at middle into a lobe extending to the middle of the sixth segment, its sides convergent; seventh ventral entire (Pl. 2, fig. 1).

Male (*Imperfect form*).—Third and fourth ventrals with the plica and fovea as above, fourth ventral truncate without trace of lobe posteriorly (Pl. 2, fig. 2).

Female.—Ventral segments absolutely simple.

Digitized by Google

With this species begins a small group of Arizona species with a generally broader and more depressed facies. The present species varies but little in color except that the abdomen may become darker than the thorax, and elytra approaching *ventrale*, in which case the color of the head and the more distinctly punctured abdomen will distinguish the present species.

Occurs in Arizona near the southern boundary.

13. C. arizonense n. sp.—Rufo-testaceous or castaneous, shining, head not darker except rarely at the sides, very sparsely pubescent. Antennæ rufo-testaceous, shorter than the head and thorax, third joint longer than the second. Head oval, less shining, sides slightly arcuate, a little broader at the hind angles than between the eyes, surface moderately coarsely punctate, denser at the sides. Thorax narrower than the head, one-fourth longer than wide, sides nearly parallel, median smooth space well defined, on each side with coarse and deep punctures, closely placed in front, distant near the side and posteriorly. Elytra one-third wider than the thorax and distinctly longer, punctuation coarser and deep not dense, regularly disposed. Abdomen finely obsoletely punctured. Legs rufo-testaceous. Length .40–.42 inch; 10–10.5 mm.

Male (*Complete form*).—Third ventral with a short plica at centre; fourth with a longer plica but less distinct, the posterior margin prolonged in a lobe reaching the middle of the sixth segment, the sides parallel, the apex obtuse; seventh ventral entire (Pl. 2, fig. 3).

Male (*Incomplete form*).—Third and fourth ventrals plicate as above, the lobe of the fourth segment short, truncate and emarginate at tip, reaching only the middle of the fifth segment (Pl. 2, fig. 4).

Male (*Imperfect form*).—The plicæ of the third and fourth ventrals rather more distinct, the posterior margin of the fourth truncate, without trace of lobe (Pl. 2, fig. 5).

Female.—Ventral segments simple, without trace of fovea or plica.

This species resembles *pimerianum*, and may be distinguished in both sexes by the concolorous head and the obsolete punctuation of the abdomen. The following species (15) has the abdomen conspicuously piceous.

Occurs in Arizona.

14. C. vitatum n. sp.—Rufo-testaceous, moderately shining, sparsely pubescent, last two segments of abdomen piceous. Antennæ rufo-testaceous, shorter than the head and thorax, third joint longer than the second. Head oval, coarsely and moderately closely punctate. Thorax narrower than the head, one-fourth longer than wide, median smooth space narrow, the punctures each side coarse, deep and closely placed. Elytra one-third wider than the thorax and distinctly longer, the punctures coarse, deep and closely placed. Abdomen with distinct punctuation but fine and sparsely placed. Legs testaceous. Length .42 inch; 10.5 mm.

Male.—Unknown.

Female.—Abdomen simple.

This species resembles *pimerianum*, etc., in form and general appearance. It differs from any species known to me in having the last two

Digitized by Google

segments of the abdomen darker than the other segments, the usual tendency being to have these segments paler.

While the female alone is known to me I have no hesitation in placing it in the present series.

Two specimens ♀. Arizona.

15. C. ventrale n. sp.—Body beneath and abdomen piceous; head, thorax and elytra rufo-testaceous, shining, sparsely pubescent. Antennæ rufo-testaceous, shorter than the head and thorax, third joint longer than the second. Head oval, sides behind the eyes feebly arcuate, nearly parallel, hind angles rounded, color rufo-testaceous, sides rarely slightly darker, surface moderately coarsely and closely punctate. Thorax narrower than the head, slightly narrower posteriorly, about one-fourth longer than wide, median smooth space well defined, on each side the punctuation coarse and deep, close in front, sparse posteriorly and near the lateral margin. Elytra one-third wider than the thorax and a little longer, the punctuation coarse and deep, rather closely and regularly placed. Abdomen above very finely and sparsely punctate, beneath more distinctly punctate. Length .44 inch; 11 mm.

Male (*Complete form*).—Third ventral with a small punctiform fovea at centre; fourth ventral with a small fovea at centre, the posterior margin prolonged in a lobe with parallel sides and broad obtuse tip which extends to the middle of the sixth segment; seventh segment entire (Pl. 2, fig. 6).

Male (*Incomplete form*).—Third and fourth segments foveate as above, the lobe of the fourth variable in length extending sometimes to the margin of the fifth segment or gradually shorter, so as to be barely visible (Pl. 2, figs. 7, 8).

Male (*Imperfect form*).—Foveæ of the third and fourth ventrals very small, the latter segment truncate without trace of lobe (Pl. 2, fig. 9).

Female.—Ventral segments without trace of foveæ.

The striking differences between this species and the two preceding, to which it is most closely allied, have been already referred to in the notes on these. A very large series has been examined from which I have selected about thirty specimens for my cabinet more perfectly illustrating the polymorphic tendencies of the male than in any other species. It was the difficulty in attempting to assort the material according to what seemed to be the accepted standard, which led me to prepare the remarks on the sexual characters with which this paper is begun.

Collected in Arizona, near the southern boundary.

Series B.

The species here separated is characterized by the presence in the male of the emargination of the seventh ventral together with the prolonged lobe on the fourth. The form of the head on which Dr. LeConte laid some additional stress seems more purely a specific character, as we have the same foreshadowed in *tumidum* and several of the smaller species. It is worthy of mention that the male has the third ventral simple, the

Digitized by Google

fourth plicate, while the female has the perforated tubercle on the third as an illustration of the persistent avoidance of any sexual mark on the fourth ventral of the female. To this group should be referred two species described by Erichson, but no mention is made of any peculiarities in the form of the head; the species are *fulvipes*, from Porto Rico, and *dispar*, from Columbia. It is remarkable that in twenty species described by Dr. Sharp from Brazil (Trans. Ent. Soc. Lond. 1876), there is not one which can be referred to this series. As far as at present known we have but one.

16. C. prospiciens Lec.—Pale brown, moderately shining, sparsely pubescent. Antennæ shorter than the head and thorax, pale brown, third joint longer than the second. Head oval, eyes more prominent than usual, sides of head behind the eyes arcuately narrowing, so that the posterior portion of the head is nearly semi-circular in form, surface rather sparsely obsoletely punctured. Thorax narrower than the head, about one-fourth longer than wide, sides parallel, a median smooth space, on each side of which the punctures are fine, sparse and indistinct. Elytra one-third wider than the thorax and distinctly longer, the punctuation fine and sparse, and the pubescence more persistent than usual. Abdomen finely and moderately closely but very indistinctly punctate. Legs rufotestaceous. Length .34–.36 inch; 8.5–9 mm.

Male (*Complete form*).—Third ventral segment simple, fourth with a small fovea at centre and a narrow lobe from the middle of the hind margin extending beyond the fifth segment; seventh ventral with a triangular notch wider than deep (Pl. 2, fig. 10).

Female—Third ventral with a small tubercle at centre slightly perforated at summit (Pl. 2, fig. 12).

This species is remarkable in combining the male sexual characters of two series by the presence of the fourth ventral lobe and the emarginate seventh ventral.

In the male in my cabinet the lobe of the fourth ventral is rather broader and longer than in the specimens in Dr. LeConte's cabinet, and the fovea is more distinctly a plica.

Occurs in Texas and Arizona, five specimens.

Series C.

The males of the species here placed have the terminal ventral segment emarginate either in triangular form or with a deeper incisure with parallel sides. The fourth ventral is without trace of lobe, and with the exception of two species (*properum* and *nactum*) there is no trace of foveæ on the ventral segments.

In the accompanying table the series is primarily divided into two portions including, *first*, those with the head of the usual form of the genus, and *secondly*, those with the head rapidly narrowing from the eyes to the constriction of the neck.

Digitized by Google

While the first division is of more nearly the usual construction in the genus it nevertheless presents a slight difference worthy of mention, as it may assist in the recognition of species when only females are at hand. If we imagine a quadrangle formed by drawing a line across the front of the eyes, another parallel to it across the basal constriction of the head, and two others along the sides, it will be observed that in species 17–23 (also 16 of Series B) the quadrangle thus formed is always broader than long, while in all the species of Series A the quadrangle is either square or longer than wide.

The last three species of the present series form a group by themselves characterized by the form of the head, the occurrence of which is predicted by that of *obliquum* of Series A.

The following species occur in our fauna:

Head parallel, or somewhat arcuate behind the eyes and abruptly narrowed; hind angles distinct.....2.
Head obliquely narrowed from the eyes to the neck; the hind angles not distinct.6.
2.—Large species, piceous, almost black.....3.
Small species, brown or rufo-testaceous.....5.
3.—Sides of head strongly arcuate and broader behind the eyes..17. **tumidum.**
Sides of head nearly parallel, not wider behind the eyes 4
4.—Last ventral ♂ deeply narrowly incised..... 18. **californicum.**
Last ventral ♂ triangularly emarginate.....19. **pallipes.**
5.—Head very coarsely, deeply and closely punctured.....21. **pusillum.**
Head sparsely punctured.
Dark brown, head and thorax a little paler.....20. **properum.**
Pale rufo-testaceous, shining.
Median smooth space of thorax well defined and somewhat elevated posteriorly; punctuation of elytra very distinct.....23. **lepidum.**
Median smooth space not well defined, flat; punctuation of elytra finer and rather indistinct.....22. **nactum.**
6.—Head with extremely few punctures .....7.
Head smooth in front, normally punctured posteriorly.....8.
7.—Piceous, elytra rufo-testaceous, coarsely deeply, not closely punctate. 24. **cribratum.**
Anterior portion of head, thorax, two basal and two apical segments black, surface elsewhere reddish yellow; elytra sparsely coarsely punctate. 26. **serpentinum.**
8.—Color black, elytra reddish yellow with a broad sutural stripe not reaching the apex; punctuation of elytra close.....25. **sellatum.**

17. C. tumidum Lec.—Piceous, almost black, elytra somewhat paler, shining, sparsely pubescent. Antennæ rufo-testaceous, nearly as long as the head and thorax, third joint distinctly longer than the second. Head black, shining, broadly oval, wider behind the eyes, the sides arcuate, hind angles broadly rounded, surface coarsely, deeply and closely punctate. Thorax narrower than the head, about one-fourth wider than long, sides parallel, median smooth space well defined, the punctures finer than those of the head, closely placed near the smooth

Digitized by Google

space, otherwise sparse. Elytra one-third wider than the thorax and slightly longer, the punctuation equal to that of the thorax, deep, closely and regularly placed. Abdomen rather coarsely and closely punctate the surface distinctly alutaceous. Legs rufo-testaceous. Length .34–.40 inch; 8.5–10 mm.

Male.—Seventh ventral segment deeply emarginate, the emargination nearly twice as deep as wide and rounded at bottom (Pl. 2. fig. 13).

Female.—Seventh ventral entire.

This species is closely related to *californicum*, but differs in both sexes by the form of the head.

Occurs in California, Arizona and Utah.

18. C. californicum Lec.—Piceous or nearly black, shining. Antennæ piceous, much shorter than the head and thorax. Head oval, sides parallel or very slightly convergent behind, coarsely not closely punctate, smoother in front, surface shining. Thorax narrower than the head, scarcely a fourth longer than wide, slightly narrower posteriorly, median smooth space distinct, the punctures on each side a little coarser than those on the head and not numerous. Elytra one-fourth wider and a little longer than the thorax, punctuation finer than on the thorax, densely placed, the surface shining. Abdomen rather coarsely and moderately closely punctured, surface slightly iridescent. Legs pale rufo-testaceous. Length .30–.34 inch; 7.5–8.5 mm.

Male.—Seventh ventral segment with a deep notch with nearly parallel sides and rounded at bottom and prolonged in a shallow groove forward; sixth segment broadly and feebly emarginate at middle (Pl. 2, fig. 14).

Female.—Ventral segments entire.

While it superficially resembles *tumidum*, the present species is really more nearly related to *pallipes*.

Occurs in Vancouver, Nevada and through California to the south.

19. C. pallipes Grav.—Piceous, nearly black, shining. Antennæ rufo-testaceous or brownish, nearly as long as the head and thorax. Head oval, punctuation a little variable, either quite sparse or moderately close, sides nearly parallel or slightly arcuate. Thorax a little narrower than the head, barely a fifth longer than wide, median smooth space well defined, the punctures each side moderate in size not closely but rather regularly placed over the entire surface. Elytra a very little wider than the thorax and as long or a very little longer, the punctuation finer than that of the thorax, rather densely placed and sometimes submuricate towards the sides. Abdomen rather coarsely and closely punctate. Legs rufo-testaceous. Length .30–.44 inch; 7.5–11 mm.

Male.—Last ventral triangularly emarginate, the notch as wide as deep; sixth ventral entire (Pl. 2, fig. 15).

Female.—Ventral segments entire.

In studying the material before me I find a certain amount of variation in the form of the head and its sculpture and the length of the elytra as compared with the thorax. The head may have the sides either slightly arcuate or nearly parallel, the former being usually but not always in the male, and as nearly all the species exhibit a similer variation this is passed without further notice. The variation of the elytra in length

Digitized by Google

is partly real and at times merely a deception, at all events the same has been observed in the two preceding species, and is also mentioned as occurring in the European species *glaberrimum* (Fauvel, Faune Gallo-Rhénane iii, p. 365). Finally the punctuation of the head may be well separated or may be coarser and closer. This character if borne out by others might give the means of separating the species into at least two. If, however, the specimens are assorted on this basis we will find all forms of head and length of elytra equally confused. Moreover the character seems gradually evanescent.

In the large series before me I am entirely unable to separate *pallipes* and *latebricola*, nor do I find any characters of moment given by Erichson. I also add as a synonym *flavicorne* Lec. as it proves to be a slightly immature specimen.

Occurs from Canada to Florida and westward to Missouri.

20. C. properum n. sp.—Piceous, subopaque, head and thorax brown. Antennæ rufo-testaceous, nearly as long as the head and thorax, third joint very little longer than the second. Head oval, sides arcuately narrowing to base, surface relatively coarsely but sparsely punctate. Thorax very little narrower than the head and very little longer than wide, sides slightly arcuate, median smooth space distinct, the punctures each side rather large, not deeply impressed and sparsely placed. Elytra a little wider than the thorax and slightly longer, the punctuation coarse and closely placed. Abdomen slightly iridescent, punctuation fine and not closely placed. Legs rufo-testaceous. Length .28 inch; 7 mm.

Male.—Third ventral segment with a tubercle at centre punctured at its summit; seventh ventral deeply emarginate, the emargination narrow and with slightly divergent sides; sixth ventral with a slight notch at middle (Pl. 2, fig. 16).

Female.—Ventral segments entire.

At first sight resembles a very small *pallipes*, but is more slender. The sexual characters of the male will distinguish it readily. It is possible that more specimens may show this species to belong with Series B.

Arizona, three specimens ♂ ♂, ♀.

21. C. pusillum Lec.—Form slender, piceous brown, shining. Antennæ nearly as long as the head and thorax, rufo-testaceous, third joint scarcely longer than the second. Head oval, slightly narrowing behind the eyes which are slightly prominent, surface shining, unusually coarsely and deeply, rather closely punctate. Thorax nearly as wide as the head, slightly narrower behind, one-fourth longer than wide, median smooth space narrow, the punctuation very coarse and deep, closely placed. Elytra very little wider than the thorax, and not longer, the punctuation less coarse than on the thorax, deep and rather closely placed. Abdomen coarsely, not closely punctate. Legs yellowish testaceous. Length .20 inch; 5 mm.

Male.—Seventh ventral with a deep notch with parallel sides; sixth ventral slightly impressed at the middle of the hind margin.

Female.—Unknown.

Digitized by Google

A small slender species remarkable for the unusually coarse punctuation of the head and thorax.

One specimen ♂ from Long Island, near New York (cab. LeConte).

22. C. nactum n. sp.—Slender, rufo-testaceous, shining. Antennæ slender, rufo-testaceous, as long as the head and thorax, third joint distinctly longer than the second. Head oval, abruptly narrowed to a very slender neck, sides arcuately narrowing, surface shining, very sparsely punctate. Thorax narrower than the head, about one-fifth longer than wide, the median smooth space not well defined, a row of very obsolete punctures along its middle, the lateral punctures moderate in size, sparsely irregularly placed. Elytra wider than the thorax, scarcely longer, depressed, the punctuation fine and dense, sutural line scarcely impressed. Abdomen more coarsely, sparsely punctured. Length .20 inch; 5 mm.

Male.—Seventh ventral with a small, broadly triangular emargination; fourth ventral with two fovea at middle, side by side, near the base of the segment (Pl. 2, fig. 18).

Female.—Unknown.

A small depressed species resembling a diminutive *arizonense*, with unique sexual characters, and with the elytra less distinctly punctured than any other species in our fauna.

One specimen, Arizona, my cabinet.

23. C. lepidum Lec.—Slender, depressed, rufo-testaceous, moderately shining, sparsely pubescent. Antennæ rufo-testaceous, shorter than the head and thorax, third joint distinctly longer than the second. Head oval, the sides parallel for a short distance in front then arcuately narrowing, the hind angles very broadly rounded, eyes slightly prominent, surface shining, punctuation relatively coarse, sparsely placed. Thorax narrower than the head, about one-fourth longer than wide, the sides slightly arcuately narrowing in front, median smooth space distinctly limited, slightly elevated behind, the punctures coarse and closely placed near the smooth space more distant and irregular toward the sides. Elytra one-fourth wider than the thorax and very decidedly longer, the punctuation moderately coarse and deep, regularly but not very closely placed, separated from each other by at least their own diameters. Abdomen moderately coarsely and rather closely placed. Legs pale rufo-testaceous. Length .14–.16 inch; 3.5–4 mm.

Male.—Unknown.

Female.—Ventral segments entire.

Of this species I have seen but the two in the cabinet of Dr. LeConte. Among our species it resembles *nactum* alone, which is quite differently sculptured, especially on the elytra.

Two females, Texas.

24. C. cribratum Lec.—Elongate, black, shining, elytra pale rufo-testaceous with the suture at base and basal margin narrowly piceous. Antennæ rufo-testaceous, shorter than the head and thorax, the third joint longer than the second. Head elongate oval, sides gradually narrowing behind the eyes, surface shining, very sparsely punctate. Thorax somewhat narrower than the head, one-fourth longer than wide, apex slightly narrower than the base, sides slightly arcuate, median space smooth, on each side a distinct dorsal series of from 7 to 9

Digitized by Google

coarse punctures external to which are a few punctures sparsely placed. Elytra one-third wider than the thorax and about as long, surface shining with the punctures coarse distantly placed, arranged in about nine series. Abdomen moderately coarsely and closely punctate. Legs yellowish testaceous. Length .34–.40 inch; .5–10 mm.

Male.—Seventh ventral segment with a triangular emargination extending about one-fourth the length of the segment, its sides slightly inflexed.

Female.—Ventral segments entire (Pl. 2, fig. 19).

A conspicuous species, readily known by the narrowed head and the sculpture of the head and elytra.

Occurs from Massachusetts to District of Columbia; westward to Nebraska.

25. C. sellatum Lec.—Black, shining, elytra rufo-testaceous, with a broad sutural black space reaching two-thirds to apex. Antennæ rufo-testaceous, nearly as long as the head and thorax, third joint very little longer than the second Head oval, eyes slightly rounded, sides gradually narrower to the neck, surface shining, coarsely and moderately closely punctate. Thorax narrower than the head, one-fourth longer than wide, median smooth space distinct, punctures each side coarse and sparsely placed. Elytra one-third wider than the thorax and distinctly longer, the punctuation moderately coarse and closely placed. Abdomen rather finely and moderately closely punctate. Legs yellowish testaceous. Length .32–.36 inch; 8–9 mm.

Male.—Last ventral with a triangular emargination extending one-fourth the length of the segment, the sides of the notch slightly inflexed (Pl. 2, fig. 20).

Female.—Ventral segments entire.

A very easily known species, resembling the preceding in color, but distinguishable by the sculpture.

Occurs in Illinois, Kansas, Nebraska and Dacotah, rare.

26. C. serpentinum Lec.—Slender, elongate, body beneath, anterior portion of head, two apical and two basal segments of abdomen black, the rest of the surface reddish yellow, shining. Antennæ nearly as long as the head and thorax, rufo-testaceous, joints 2–4 darker, the third slightly longer than the second. Head oval, very shining and with very few punctures, the sides arcuately narrowed from the eyes to the neck; color reddish yellow, that portion of the head in front of an arcuate line starting slightly behind the eyes, black. Thorax narrower than the head, almost a third longer than wide, apex distinctly narrower the punctures rather coarse forming an irregular discal series on each side of the smooth space, and with very few punctures between this and the lateral margin. Elytra one-fourth wider than the thorax and slightly shorter, conjointly nearly square, the punctuation coarse, deep and distant, arranged in very vague series; color reddish yellow with the scutellar region narrowly piceous. Abdomen shining, the punctuation rather coarse and very sparsely placed. Legs pale reddish yellow. Length .38–.40 inch; 9.5–10 mm.

Male.—Seventh ventral segment with a triangular emargination, extending one-fourth the length of the segment, the sides slightly inflexed (Pl. 2, fig. 21).

Female.—Ventral segments entire.

Digitized by Google

A very beautiful species with notable resemblance in form to *Ophites*, as remarked by Dr. LeConte. The style of coloration is certainly remarkable, the head being partly reddish yellow and black, the thorax black, elytra reddish yellow, the first two abdominal segments black, the third, fourth, fifth and base of sixth reddish yellow, the sixth otherwise and seventh black.

A very rare species, of which I have seen but four specimens from Pennsylvania, North Carolina, Alabama and Kansas.

While the preceding pages were passing through the press there appeared a pamphlet, privately printed by Lieut. Casey, in which, among other things, four new species of Crytobium are described from uniques in three and two specimens in the fourth. These are—

C. capito. Is a somewhat immature male of *C. pallipes* Grav.

C. convergens, *parallelum* and *proximum* are specimens in various stages of maturity of *C. floridanum* Lec. They are all, moreover, males of the form described in the preceding pages as *imperfect*, and not females, as described by Casey.

The actual types of the above are before me, they having been, on my application, kindly loaned me for study by the Museum of Comparative Zoology at Cambridge, to which Mr. Casey has presented his entire collection.

In order to give some idea of the ventral differences in the males I have prepared the accompanying outline plates which are rather diagrams than exact figures of the modifications spoken of in the preceding pages. Many of the figures are practically repetitions, but I have given them all to show in what species the modifications have been observed.

Digitized by Google

Synonymy and Bibliography.

CRYPTOBIUM Mann.

1.—**C. badium** Grav. Micr. p. 53; Mon. p. 135; Erichs. Staph. p. 562.
2.—**C. foridanum** Lec. Proc. Amer. Philos. Soc. 1878, p. 389.
3.—**C. anceps** n. sp. ante.
4.—**C. despectum** Lec. New Species, 1863, p. 45.
5.—**C. lugubre** Lec. Proc. Amer. Philos. Soc. 1878, p. 393.
6.—**C. obliquum** Lec. loc. cit. p. 394.
parcum Lec. ♀ loc. cit. p. 394.
7.—**C. bicolor** Grav. Micr. p. 179; Mon. p. 135; Say, Trans. Amer. Philos. Soc. n. s. iv, p. 454; Nordm. Symb. p. 145; Kirby, Faun. Bor. Am. p. 87; Erichs. Staph. p. 563.
8.—**C. carolinum** Erichs. Staph. p. 563.
9.—**C. texanum** Lec. Proc. Amer. Philos. Soc. 1878, p. 392.
10.—**C. LeContei** Horn ante.
carolinum ‡ Lec. Proc. Am. Philos. Soc. 1878, p. 390.
11.—**C. vagum** n. sp. ante.
12.—**C. pimerianum** Lec. New Species, 1863, p. 45.
13.—**C. arizonense** n. sp. ante.
14.—**C. vitatum** n. sp. ante.
15.—**C. ventrale** n. sp. ante.
16.—**C. prospiciens** Lec. Proc. Amer. Philos. Soc. 1878, p. 393.
7.—**C. tumidum** Lec. loc. cit. p. 393.
18.—**C. californicum** Lec. loc. cit. p. 392.
19.—**C. pallipes** Grav. Micr. p. 179; Mon. p. 130; Nordm. Symb. p. 149; Erichs. Staph. p. 568.
cinctum Say, Trans. Amer. Philos. Soc. n. s. iv, p. 454.
latebricola Nordm. Symb. p. 150; Erichs. Staph. 569.
Gravenhorstii Kirby, Fauna Bor. Am. p. 87, pl. 2, fig. 2.
flavicorne Lec. loc. cit. p. 392.
20.—**C. properum** n. sp. ante.
21.—**C. pusillum** Lec. New Species, 1863, p. 45.
22.—**C. nactum** n. sp. ante.
23.—**C. lepidum** Lec. Proc. Amer. Philos. Soc. 1878, p. 395.
24.—**C. oribratum** Lec. New Species, 1863, p. 46.
25.—**C. sellatum** Lec. New Species, 1863, p. 45.
26.—**C. serpentinum** Lec. New Species, 1863, p. 46.

Digitized by Google

EXPLANATION OF PLATE I.

C. badium, 1 complete ♂, 2 imperfect ♂, 3 female.
C. floridanum, 4 ♂ only form known, 5 female.
C. anceps, 6 ♂ only form known.
C. despectum, 7 complete ♂.
C. lugubre, 8 ♂ only form known, 9 female.
C. obliquum, 10 ♂.
C. bicolor, 11 complete ♂, 12 incomplete ♂, 14 female.
C. carolinum, 15 complete ♂, 16 imperfect ♂.
C. Lecontei, 17 complete ♂, 18 incomplete ♂, 19 imperfect ♂.
C. texanum, 20 complete ♂, 21 incomplete ♂, 22 imperfect ♂.
C. vagum, 23 complete ♂, 24 incomplete ♂, 25 imperfect ♂.

EXPLANATION OF PLATE II.

C. pimerianum, 1 complete ♂, 2 imperfect ♂.
C. arizonense, 3 complete ♂, 4 incomplete ♂, 5 imperfect ♂.
C. ventrale, 6 complete ♂, 7 and 8 incomplete ♂ ♂, 9 imperfect ♂.
C. prospiciens, 10 complete ♂, 11 incomplete ♂, 12 female.
C. tumidum, 13 ♂.
C. californicum, 14 ♂.
C. pallipes, 15 ♂.
C. properum, 16 ♂.
C. pusillum, 17 ♂.
C. nactum, 18 ♂.
C. cribratum, 19 ♂.
C. sellatum, 20 ♂.
C. serpentinum, 21 ♂.
22.—Head of *C. obliquum*.
23.—Head of *C. serpentinum*.
24.—Head of *C. bicolor*, *pimerianum*, etc.
25.—Head of *C. prospiciens*.

Digitized by Google

Studies among the MELOIDÆ.

BY GEORGE H. HORN, M. D.

With collections coming from almost every region of our western country new species of this family are constantly occurring. No sooner is a monographic study presented than it is made insufficient by the discovery of new forms. As a rule new species have been allowed to accumulate until their number seemed to warrant the repetition of at least the synoptic table and the following pages have been prepared on that basis.

Through the kindness of Sig. Eug. Dugès I have been enabled to study typical specimens of some species described by him from several Mexican localities. Several years ago I saw in the cabinet of Mr. Sallé, of Paris, a few of the species, and recognized among them several familiar forms, and as the species of this family have been abundantly collected in Texas, Arizona and California, it seemed probable that some of them might extend their habitat to Mexico, and that a comparison might result advantageously to science.

Macrobasis Borrei Dugès. Very distinct from any in our fauna. It is by the antennal structure more allied to our larger species *albida*, etc.

Cantharis punctuata Dugès. Is the same as our *Epicauta conspersa* Lec., which is considered merely a variety of *maculata* Say. The last name should prevail.

Cantharis ocellata Dugès. By the material in our fauna this species is not considered distinct from the preceding.

Cantharis cupreola Dugès. Closely related to *cinerea*, but with shorter and stouter antennæ. It resembles more closely the uniformly cinereous variety of *cinerea*. It occurs also in Texas.

Cantharis vicina Dugès. Belongs to the series with filiform antennæ, and is most closely related to our *sericans* Lec.

Cantharis nigerrima Dugès. Is *Epicauta corvina* Lec.

Cantharis nigra Dugès. Is very near *Epicauta funebris* Horn.

Cantharis cinctipennis Chev. Extremely close to *Epicauta cinerea* Forst., and probably not different.

Cantharis croceicincta Dugès. Also related to *E. cinerea*, but more slender and with the anterior tibiæ of the male more deeply sinuate.

Cantharis stigmata Dugès. Is the entirely cinereous variety of *cinerea* Forst.

Cantharis variabilis Dugès. Is *C puberula* Lec. The latter name should prevail.

Digitized by Google

Cantharis monilicornis Dugès. Is a true *Cantharis*, apparently distinct from any in our fauna.

Cantharis erythrothorax Mendoza y Herrera. Is a true *Cantharis*. It is related to *C. mutilata* Horn, but the two are distinct. The former has constantly two black spots on the red thorax and differs also in its sexual characters.

Tetraonyx femoralis Dugès. Resembles *frontalis* Chev., but the femora are yellow except at tip and base. The same species occurs in Arizona.

Tetraonyx rufus Dugès. Is *fulvus* Lec.

Nemognatha zonitoides Dugès. Is most closely related to but distinct from *sparsa* Lec.

MACROBASIS Lec.

M. purpurea n. sp.—Piceous, sparsely clothed with cinereous pubescence, elytra purplish with narrow sutural, median and marginal cinereous vittæ. Antennæ slender, setaceous, brown. Head large, moderately closely punctate, sparsely clothed with cinereous pubescence, vertex with a large purplish spot with median cinereous line. Thorax quadrate, narrower than the head, anterior angles rounded, median line moderately impressed, moderately closely punctate, clothed with cinereous hair, disc with large purple spot with median cinereous line. Elytra very little wider than the head, purplish clothed with purplish pubescence with the suture and margin narrowly cinereous and a median vitta of the same color. Body beneath moderately closely punctate, sparsely clothed with cinereous pubescence. Legs brownish. Length .42 inch; 10.5 mm.

Male.—Anterior tibiæ with one spur. First joint of antennæ as long nearly as the four following, arcuate gradually wider from base, not contorted at apex, second joint nearly as long as the two following. Sixth ventral segment feebly emarginate at tip.

This species belongs to that division of Macrobasis in which the first joint of the antennæ ♂ may be called very long, and should be placed with those species with one anterior tibial spur, from all of which it differs in the much longer second joint of the antennæ and the surface ornamentation.

One specimen. Arizona.

M. lauta n. sp.—Form slender, rufo-testaceous or pink, sparsely clothed with cinereous pubescence, legs black. Antennæ slender, setaceous, black. Head finely, densely punctate. Thorax longer than wide, sides in front convergent, posteriorly parallel, densely finely punctate. Elytra wider than the thorax, densely punctulate, pubescence very fine. Body beneath moderately densely punctate, pubescence cinereous and longer. Legs black, femora rufo-testaceous with black knees. Length .48–.56 inch; 12–14 mm.

Male.—Antennæ with first joint about as long as the next two, slightly arcuate, joints 2–11 equal in length. Anterior tibiæ with one spur; first joint of anterior tarsus much compressed, not pubescent beneath. Last ventral segment scarcely emarginate.

Female.—Antennæ not very different from male, the first joint shorter. Anterior tibiæ with two spurs. the first joint of tarsus not compressed, pubescent beneath.

Digitized by Google

This species should be placed in the division of the genus near *immaculata*. It resembles *linearis* somewhat at first sight.

Collected in Arizona by Morrison.

M. sublineata Lec. has been found to be a rubbed specimen of *longicollis* Lec.

At the time of my review of the species of Macrobasis (Proc. Am. Philos. Soc. 1873) the males of several were wanting to enable me to complete the work. Since that time three new species have been collected in our fauna, and additional material of most of the older ones obtained The male of *linearis* is now known, that of *tenella* has not yet been found, but I have no hesitation in giving it a place in a tabular arrangement.

M. linearis Lec.—Piceous, elytra and legs in part luteous, rather sparsely clothed with cinereous pubescence. Varies with the legs nearly piceous.

Male.—Antennæ with the first joint long, equal to the next five joints together, scarcely arcuate, the anterior edge with a broad shallow groove; second joint one-third the length of the first and as long as the next two together; joints 3–11 very gradually shorter and more slender to tip. Anterior tibiæ with one terminal spur. First joint of anterior tarsi much shorter than the second, oval, concave on its inner side. Last ventral segment feebly emarginate.

Female.—First joint of antennæ about equal to the next two, joints 2–11 very gradually decreasing in length and more slender to tip. Anterior tibiæ with two spurs, first joint of tarsus long, nearly equal to the next two.

The following table is the result of a renewed study, and is a modification of that given by me in 1873. The characters used are entirely sexual, all attempts to prepare an empirical table for the separation of specimens regardless of sex have entirely failed.

M. Borrei Dugès is the only species described out of our fauna, and is added for comparison.

The accumulation of species indicates that the feeble characters separating Macrobasis and Epicauta will soon cease to have generic value.

First joint of antennæ dissimilar in the sexes, that of the male being at least as as long as the next two and often as long as the next four.....2.

First joint of antennæ similar in the sexes, and not in either sex longer than the next two.....10.

2.—First joint of antennæ ♂ with a sinuation, of varying extent, on the lower edge near the tip.....3.

First joint of antennæ ♂ without sinuation, straight or feebly arcuate.....8.

3.—Anterior tibiæ ♂ with two terminal spurs.....4.

Anterior tibiæ ♂ with one terminal spur.....5.

4.—Species large (24 mm.), antennæ in part rufo-testaceous; pubescence fine and silken.....**albida.**

Species small (10 mm.), antennæ black, pubescence coarse.....**Borrei.**

Digitized by Google

5.—First joint of anterior tarsi ♂ as long as or longer than the second, normal in form ..... 6.

First joint of anterior tarsi ♂ shorter than the second, very narrow at base, and more or less dilated externally ..... 7.

6.—Second joint of antennæ ♂ ovate, stout.

Body uniformly clothed with cinereous or slightly ochreous pubescence. **longicollis.**

Body with cinereous and black pubescence, on the elytra forming broad vittæ, beneath transversely banded .. .. **atrivittata.**

Second joint of antennæ ♂ long, compressed cylindrical, body clothed with purplish black pubescence, elytra with entire border and suture, and a narrow median vitta cinereous ..... **purpurea.**

7.—Second joint of antennæ ♂ small and conical; legs rufo-testaceous. **virgulata.**

Second joint of antennæ ♂ long, cylindrical compressed; legs black. **torsa.**

8.—Anterior tibiæ ♂ with two terminal spurs ..... **unicolor.**

Anterior tibiæ ♂ with one terminal spur ..... 9.

9.—Second joint of antennæ ♂ much longer than the third, cylindrical compressed.

Black, uniformly clothed with cinereous pubescence ..... **tenuis.**

Elytra and legs in part luteous ..... **linearis.**

Second joint of antennæ ♂ not longer than the second, the outer joints somewhat moniliform.

Body entirely pale ochraceous ..... **ochrea.**

10.—Anterior tibiæ ♂ with one spur ..... 11.

Anterior tibiæ ♂ with two spurs ..... 12.

11.—First joint of anterior tarsi ♂ much shorter than the second, narrower at base, broader externally; black, very sparsely cinereo-pubescent. **Gissleri.**

First joint of anterior tarsi ♂ as long or longer than the second, normal in form.

General color rufo-testaceous, legs and antennæ black ..... **lauta.**

Rufo-testaceous, elytra black, sparsely cinereo-pubescent ..... **tenella.**

12.—Cinereous to fulvo-pubescent ..... **immaculata.**

Entirely black ..... **segmentata.**

EPICAUTA Fab.

E. insignis n. sp.—Pale luteous, head and thorax darker, sparsely clothed with fulvous pubescence. Antennæ piceous, setaceous, more slender toward the tip, slightly compressed. Head piceous, densely punctate. Thorax a little longer than wide, sides parallel, slightly arcuate and narrowed in front, densely punctate, median line distinct. Elytra wider than the thorax, luteous, clothed with short fulvous pubescence, surface moderately densely punctate. Body beneath nearly black, moderately densely punctate, clothed with longer cinereous pubescence. Legs rufo-testaceous, tarsi piceous. Length .30-.34 inch; 7.5-8.5 mm.

Male.—Anterior tibiæ with one slightly arcuate spur. Last two joints of maxillary palpi broadly oval. Last ventral feebly emarginate.

Female.—Anterior tibiæ with spurs. Last two joints of maxillary palpi elongate oval.

Digitized by Google

This species is closely allied to *pedalis* but is more robust and with different male maxillary palpi; *pedalis* is nearly black above, the present species luteous. Some specimens show an indistinct vitta on each elytron of denser pubescence.

Collected in Arizona by Morrison.

C. nigritarsis Lec. has been placed by me (Proc. Am. Phil. Soc. 1873, p. 96) in error among the species with two terminal spurs in the male, it has really but one and is therefore allied to *pedalis* and *insignis* but is much more robust than either. It is similar in color to *insignis* but has slender ♂ maxillary palpi.

E. fallax n. sp.—Form slender, black, sparsely clothed with short black pubescence. Antennæ slender, setaceous, slightly compressed. Head shining, coarsely but sparsely punctured. Thorax narrower than the head, much longer than wide, somewhat campanulate in form, shining, coarsely but sparsely punctate, a smooth space on each side behind the middle somewhat more convex. Elytra much wider than the thorax, gradually wider posteriorly, surface subopaque, rather densely punctate scabrous, sparsely pubescent, with three very finely elevated lines on each side. Body beneath shining, moderately closely punctate. Length .52 inch; 13 mm.

The male has two anterior tibial spurs; last ventral feebly emarginate. Spurs of posterior tibiæ slender and acute.

This species by its characters is most closely related to *fissilabris* and *corvina* from both of which in differs by its smaller size and much narrower and longer thorax which is quite shining here and densely punctured in both the others. In general appearance it resembles *puncticollis* and *oblita*, which have filiform antennæ.

Occurs in Owen's Valley, California.

CANTHARIS Linn.

Cantharis cardinalis Chev.—From specimens shown me by Mr. Sallé this species belongs to my division of the genus in which the intermediate joints of the male antennæ are thicker. The name *C. fulvipennis* Lec. should be restored to our species known under the preceding name, excepting the sexual characters the two species are very much alike.

C. molesta n. sp.—Black, feebly shining, thorax red with a large basal spot and narrower apical margin black. Antennæ slender and long, the outer joints gradually thicker. Head very sparsely punctate, with the usual vertical spot. Thorax broader than long, sides arcuate in front, posteriorly oblique, very sparsely punctate, color orange red with a large basal black spot extending in front of middle and tridentate in front. Elytra wider than the thorax, gradually broader posteriorly, moderately closely punctate scabrous. Body beneath black, shining,

Digitized by Google

sparsely punctate. Inner spur of posterior tibiæ slender acute, outer stout, obliquely truncate and concave at tip. Length .44–.76 inch; 11–16 mm.

Male.—Antennæ gradually stouter from base to tip. Anterior tibiæ with two spurs, middle tibiæ slightly arcuate. Hind trochanter truncate at tip and with an acute spine on the lower edge. Fifth ventral deeply triangularly emarginate, sixth deeply incised, almost divided.

Female.—Antennæ shorter and a little more moniliform than the male. Posterior trochanters oval at tip, without spine. Fifth ventral entire, sixth slightly emarginate at tip.

This species should be placed near *insperata* from the structure of the posterior tibial spurs. The sexual characters are similar. From that species it differs in its more robust form; broader and more pentagonal thorax which is differently colored.

Four specimens, California, probably from near Visalia, Morrison.

PYROTA Lec.

The species of this genus are by no means easy to separate satisfactorily. The sexual and other structural characters so well marked in nearly all the other genera of *Melandræ* are here reduced almost to the minimum and reliance must be placed on the superficial characters of color and sculpture.

Having had, for some time, several species which differ very obviously from any already described the present opportunity is made use of to make them known and at the same time present some remarks on the other species which may seem useful in assisting in their determination.

The sexual characters are as nearly as possible the same in all the species. The last joint of the maxillary palpi in the male is transversely oval more acute internally, the underside being excavated and with a membranous reticulated surface, the same joint in the female is of the usual elongate form, truncate at tip. The last ventral segment of the male is incised and entire in the female. The palpi of the two sexes of *P. insulata* are shown on Pl. 5, fig. 24.

In order to avoid any detailed description of the markings I have prepared sketches of the elytra of the species, drawn as if perfectly flat, and will refer to them.

P. mylabrina Chev.—Head yellow, often with a black spot each side of the occiput and two on the front. Thorax always with two discal black spots, usually with another at the side, rarely with two or without any. Elytra yellow, marked as in fig. 13. Body beneath black, the middle of the metasternum, a space at its lateral suture and the mesosternal epimeron yellow. Abdomen black, the apical third of each segment yellow. Legs yellow, knees, tips of tibiæ and tarsi black, spurs of hind tibiæ dissimilar, the inner slender and acute, the outer stout, and obliquely truncate. Length .36–.68 inch; 9–17 mm.

Digitized by Google

The elytral markings vary somewhat in their extent and the basal spot may be longitudinally divided (Pl. 5, fig. 13).

Occurs from Colorado to Mexico.

P. terminata Lec.

The description of the preceding species applies equally to this form. It was originally described from a unique specimen in which the legs were entirely black and the elytra with but one basal spot near the suture. These two differences prove to be merely varietal, as a good series in my cabinet shows all the necessary intermediate forms. In those specimens with entirely black legs the body beneath is nearly entirely black, while the forms with partly yellow legs have the abdomen banded. It is more than probable that this form is merely a local variety of *mylabrina*.

Occurs from Missouri westward.

P. Engelmanni Lec.

Closely related to *mylabrina* and differing in the form of markings as shown on Pl. 5, fig. 14 and also by the underside of the body and legs being entirely black. The hind angles of the head are black in all the specimens before me (Pl. 5, fig. 14).

Occurs from Missouri to Texas.

P. postica Lec.—Beneath piceous, abdomen banded with testaceous. Head yellow, with very few punctures. Thorax yellow, disc flat, two black spots at middle and one each side in front of middle, surface nearly impunctate. Elytra rather shining, not densely punctate, yellow, two oval spots at base the inner longer, a large black spot behind the middle very close to the suture, but more distant from the lateral margin. Legs yellow, knees, tips of tibiæ and tarsi black. Length .72–.87 inch; 18–22 mm.

The markings as shown on Pl. 5, fig. 15, are constant in all the specimens I have seen and differ from all the fasciate forms in the absence of an apical piceous space.

The species occurs in New Mexico and Texas extending to Mexico (Monterey).

P. dubitabilis (*vittigera* ‡ Lec., *rufipennis* Chev. fide Crotch).—Beneath almost entirely black. Head dark reddish yellow, vertex sulcate but not deeply. Thorax with rather coarse punctures near the base, disc with two elongate black spots, another at the side in front. Elytra rather closely punctured, vaguely sulcate, a basal spot near the scutellum and a long broad vitta piceous. Legs black, basal half of femora reddish yellow. Length .75–.80 inch; 19–20 mm.

The only specimens I have seen of this species were collected by Dr. Berlandiere near the Rio Grande but whether in Texas or Mexico is in doubt. The elytron is represented by fig. 16 (Pl. 5). As originally described the name given by LeConte was pre-occupied and could not be

Digitized by Google

used, later in the "Check List" Crotch places the species as synonym of *rufipennis* Chev., but without making greater allowances than I think possible the description of Chevrolat will not fit our species. For these reasons I have given a new name to the species hoping that in the future a proper apportionment of the species of the composite genus Cantharis among several of its valid subdivisions will enable our species to resume the name proposed by LeConte.

P. insulata Lec.—Head almost entirely black with a frontal yellow space enclosing two small black spots. Thorax with a large discal black space which is sometimes divided, three lateral spots and one at each hind angle. Elytra dark brown or piceous, entire limb narrowly yellow, a short oblique yellow vitta beginning at the humerus and a subapical spot often joining the suture. Legs entirely black. Length .75 inch; 19 mm.

The elytral markings (Pl. 5, fig. 17) are very constant and show but little variation.

Occurs in Texas.

P. Germari Hald.—Beneath black. Head black with large frontal space yellow. Thorax reddish yellow, with two round discal black spots. Elytra densely punctured, subopaque, yellowish, a sutural vitta broader posteriorly, extending nearly to base, piceous. Legs piceous, basal half of femora and tibiæ yellow. Length .40 inch; 10 mm.

The elytra are marked as shown on Pl. 5, fig. 21, and exhibit no variation.

Occurs from Maryland to North Carolina but seems to be rare.

P. discoidea Lec.—Black beneath, last ventral segment yellow. Head yellow, very sparsely finely punctured. Thorax yellow with two small discal black spots, surface shining with very sparsely placed punctures, feebly shining, an oval piceous scutellar spot, suture piceous, broader at middle, an oblique somewhat sinuous vitta extending from the suture nearly to the apex. Legs yellow; knees, tips of tibiæ and tarsi piceous. Length .22–.44 inch; 5.5–11 mm.

The only variation observed in this species is in the color of the legs which may become almost entirely piceous. The elytral markings which are very constant are shown on Pl. 5, fig. 20.

Occurs in Texas.

P. invita n. sp.—Beneath black. Head black, an oval frontal space yellow, surface coarsely, deeply and rather closely punctured. Thorax yellow, a large discal black spot sometimes divided, surface irregular with numerous coarse and deep punctures near the base and sides. Scutellum black. Elytra subopaque, densely punctate scabrous, finely pubescent, color and markings as in *discoidea*. Legs entirely black. Length .40–.60 inch; 10–15 mm.

The elytral markings so closely resemble those of *discoidea* that I have thought it unnecessary to repeat the figure. The only variation observed is in the sutural vitta, which may be very narrow or entirely absent.

Digitized by Google

This species is most closely allied to *discoidea* but differs not only in color but also in the coarser punctuation of the head and thorax and the more opaque elytra.

Occurs in Texas near San Antonio.

P. limbalis Lec.—Body beneath yellowish. Head yellow, sparsely punctate. Thorax yellow, sparsely finely punctate, two discal spots black. Elytra punctate scabrous, subopaque, piceous, the entire limb yellow. Legs piceous, the femora at base yellow. Length .36 inch; 9-10 mm.

The elytral markings are shown on Pl. 5, fig. 18.

Occurs in Virginia.

P. lineata Oliv.—Beneath yellowish, the sides of body maculate with piceous, the abdominal segments piceous at base. Head reddish yellow, very sparsely punctate. Thorax reddish yellow, very nearly entirely smooth, two discal spots piceous. Elytra rather densely punctate scabrous, subopaque, piceous, entire limb and a narrow median vitta yellow. Legs yellow; knees, tips of tibiæ and tarsi piceous. Length .44 inch; 11 mm.

This species has remained unknown to us until very recently when two specimens have reached me almost simultaneously from Georgia and Texas. The elytral markings are shown by fig. 19, the Texas specimen having the yellow border and vitta somewhat broader.

G. bilineata n. sp.—Form rather slender, reddish yellow, elytra paler yellow, each with two entire, narrow black vittæ. Antennæ black, the basal joint very little longer than the next two together. Head coarsely but very sparsely punctate. Thorax elongate, parallel behind, narrowed in front, disc shining with few punctures, a small black spot on each side at middle, rarely absent. Elytra pale yellow, the black vittæ, slender and nearly straight, surface shining rather feebly punctate scabrous. Body beneath sparsely punctate and pubescent. Legs reddish yellow, femora at knees, tibiæ at tips and tarsi piceous. Length .28–.38; 7-9.5 mm.

A pretty and neat species not resembling any other in our fauna. It had been considered *lineata* but this is quite a different species. The elytral markings are shown on Pl. 5, fig. 22.

Occurs in Colorado and Arizona.

P. sinuata Oliv. (*Afzeliana* Fab).—Head yellow with two occipital spots. Thorax yellow with two discal spots. Elytra yellow with a scutellar spot and a sinuous vitta piceous. Legs entirely yellow. Length about .44 inch; 11 mm;

This species still remains unknown to us. I have reproduced the markings of the elytra as given by Olivier to assist in its identification (Pl. 5, fig. 23).

Occurs in Carolina.

Digitized by Google

TETRAONYX Latr.

The species known to inhabit our Territory are separated in the following manner:

Elytra entirely fulvous.
Elytra rather densely punctate, not shining, pubescence fine and entirely recumbent. Front black, occiput fulvous.
Legs entirely black.....**frontalis** Chevr.
Femora yellow tipped with black at base and knee.....**femoralis** Dugès.
Elytra not densely punctate, shining, pubescence rather coarse and erect. Head entirely fulvous.....**fulva** Lec.
Elytra fulvous, apical third and large humeral spot black.
Head entirely black; femora and coxæ yellow, the former black at the knees.
quadrimaculata Fab.

T. femoralis Dugès, La Naturaleza, vol. i, p. 104.—Black beneath, above fulvous. Head fulvous, the front black, sparsely punctate, the punctures finer on the fulvous portion. Antennæ black, not longer than the head and thorax. Thorax transverse, basal margin reflexed at middle, surface moderately finely not densely punctate, finely pubescent. Elytra wider than the thorax, densely punctate, opaque, pubescence short, fine, recumbent and sericeous. Legs black, middle third of femora yellow. Length .36–.54 inch; 9–13.5 mm.

This species has the same general form and sculpture as in *frontalis* and differs in the color of the femora. The antennæ of *frontalis* are much longer than the head and thorax.

Five specimens, Arizona. Also in Mexico.

T. quadrimaculata Fab.—Is further remarkable in having the head and thorax coarsely and closely punctured. Georgia and South Carolina.

T. frontalis Chev.—Seems to have escaped mention as an inhabitant of our fauna. I have two specimens from Texas.

T. fulva Lec.—Entirely fulvous above, with sparser punctuation, sparser and erect pubescence. The legs are yellow, the femora at the knees, the tibiæ at tips and tarsi black. Texas and New Mexico.

Digitized by Google

Descriptions of new North American SCARABÆIDÆ.

BY GEORGE H. HORN, M. D.

The species described in the following pages introduce three genera into our lists which were previously not with certainty known to occur with us: Glaresis, Phytalus and Orizabus. The last two had occurred so near our southwestern border that species were confidently expected, but I know of no reason why Glaresis could have been expected to occur in the same region.

The full number of Listrochelus is not yet complete as there are yet wanting species with structural characters filling the evident blanks which I have illustrated in a table published some time ago.

In Plusiotis new species rarely present themselves, while new Cremastochili appear with sufficient frequency to disarrrange all the synopses which have been published.

GLARESIS Erichs.

G. mendica n. sp.—Oblong oval, robust, dark brown, opaque. Head rugulose, occiput vaguely transversely carinate. Thorax nearly twice as wide as long, slightly narrower in front, sides nearly straight, the margin crenulate, disc convex, a subapical impressed line, a median impressed line deeper posteriorly, a vague fovea each side slightly in front of middle, another near the side margin. Elytra very little wider than the thorax, sides nearly straight, slightly divergent posteriorly, disc convex, each elytron with eight finely elevated costæ bearing short setæ on their summits, the intervals concave with vague foveæ not closely placed. Body beneath and legs rugulose and subopaque. Length .12 inch; 3 mm.

The ornamentation of the thorax consists of small distant granular elevations which near the sides become more elongate forming short lines.

One specimen, Arizona.

G. inducta n. sp.—Form robust, ferruginous, not shining. Head slightly granulate rugose in front, punctate posteriorly, a slight depression above the base the of antennæ. Thorax more than twice as wide as long, gradually narrower from base to apex, sides nearly straight, margin not crenulate, subapical impression very feeble, median line very indistinctly channeled, a vague depression near the middle of the side close to the margin, surface opaque with short finely elevated longitudinal lines. Elytra finely costulate, the costæ catenulate, intervals concave with a single row of barely perceptible large punctures. Body beneath opaque, obsoletely punctate. Length .12 inch; 3 mm.

Digitized by Google

A slightly smaller and more robust species than the preceding with the elytral costæ much less elevated and the punctures of the intervals even more indistinct.

Two specimens, southwestern Texas.

The genus Glaresis was indicated, and the characters given rather summarily by Erichson, but to Westwood we owe a full exposition of its details. Regarding its systematic position there is some doubt as Westwood places it among the Orphnides, while Erichson and Lacordaire consider it a Trogide. The material at my disposal does not admit of dissection, and I can only accept the views of the last named authors.

Glaresis might be compared in form to some of our Aegialiæ. From Trox it differs in having the first joint of the antennæ cupuliform and the abdomen small, membranous and retracted under the posterior coxæ.

The only species at present described is *G. Frivaldskyi* Ww. from Hungary and it is very remarkable to find now two species in our country and in such a very remote region.

As there are now three species known the following sketch gives in brief their distinctive characters.

G. Frivaldskyi Westw. Head with very distinct transverse impression from the base of each antennæ, median line of front distinctly impressed. Thorax—a deep post-apical impression, deeper near the angles, median line very deeply sulcate, an oblique fovea each side of median line in front of middle and another posterior to the first but more distant from the median line, a depression near the middle of the side margin; sides of thorax, straight, convergent to the front, the margin crenulate; surface with small granulations. Elytral costæ well marked, intervals with distinct foveæ.

G. mendica Horn. Head obsoletely foveate at the base of the antennæ, no median groove. Thorax—post-apical line distinct not deeper externally, median line moderately deeply excavate, an oval fovea near the median line slightly in front of middle, another near the middle of side margin. Elytral costæ moderately elevated, the foveæ of the intervals indistinct.

G. inducta Horn. Head as in *mendica*. Post-apical line of thorax feeble, median line feebly channeled a feeble fovea near the side margin. Elytral costæ feeble, the foveæ of the intervals scarcely distinct.

Digitized by Google

PLECTRODES Horn.

P. palpalis Horn, Trans. Am. Ent. Soc. viii, p. 146.

The specimens hitherto collected of Plectrodes have consisted of males alone and the descriptions of the three species apply to that sex alone. A short time since Mr. Behrens, of San Francisco, loaned me a female of the above species which differs from the male by some characters worthy of note.

The form and vestiture do not differ in the sexes, and the tibiæ have similar teeth on the front pair while the middle and posterior are mucronate in a similar manner. The antennal club is but two-thirds in the female the length in the male. The last joint of the maxillary palpi is about half the length in the female, more oval and more acute at tip, the impression quite shallow and not deeper than observed in *pubescens*. In the male the anterior claw of each tarsus is armed with a moderately long tooth near the base and very nearly of equal length on all three tarsi; the posterior claw is also toothed but that of the front tarsus has a very feeble tooth, a larger one on the middle tarsus while on the posterior tarsi the claws are nearly equally toothed. In the female the anterior claws are toothed as in the male, the posterior claws are also toothed, but less strongly than the anterior, and on all three tarsi very nearly equally.

PHYTALUS Erichs.

At the time of the publication of the "Classification" several species of this genus were known to us, but as none of them were described the name was accidentally omitted. Phytalus should be associated with Lachnosterna and Listrochelus, from both of which it differs in having the claws cleft at tip.

In examining the species before me I find the claws differing, two of them having the claws so cleft that the upper portion is more slender and shorter than the lower portion, while in the others the reverse is the case. Two of the Mexican species described by Blanchard are known to me by specimens kindly sent me by Mr. Sallé, and are mentioned in my table for the sake of comparison. The following are the species known to me in nature:

Claws unequally cleft, the upper portion more slender and shorter than the lower.....2.

Claws more equally cleft, the upper portion nearly as stout and always longer than the lower.....3.

2.--Thorax very regularly closely and rather coarsely punctate. Outer spur of hind tibiæ of ♂ short, fixed. Form robust. Clypeus feebly emarginate.
robustus n. sp.

Digitized by Google

Thorax shining, irregularly and sparsely, coarsely punctate. Spurs of hind tibiæ ♂ free and slender. Form oblong. Clypeus feebly emarginate.
laevigatus Bl.

3.—Thorax with a distinct basal marginal line, interrupted at middle.
Clypeus rather strongly emarginate, thorax rather finely but regularly sparsely punctate..... .....**cephalicus** n. sp.
Clypeus scarcely at all emarginate, thorax very coarsely and irregularly sparsely punctate.....**pubicollis** Bl.
Thorax without basal marginal line, clypeus feebly emarginate.
Elevated portion of prosternum behind the front coxæ in form of a transverse lamina broadly emarginate at summit.
Head rugosely punctate, the punctures coarse and more or less confluent.
pallidus n. sp.
Head coarsely punctate, the punctures distinct and not confluent.
vexatus n. sp.
Elevated portion of prosternum deeply emarginate, the angles prolonged in the form of processes.
Head pale, not densely nor coarsely punctate.....**debilis** n. sp.
Head piceous, deeply, coarsely and densely punctate.
georgianus n. sp.

P. cephalicus n. sp.—Form rather slender, moderately elongate, color varying from piceous to castaneous. Head coarsely and deeply but not closely punctate, a distinct longitudinal frontal impression, clypeus rather deeply emarginate, more densely punctured and rugose than the front. Thorax short, more than twice as wide as long, apex feebly emarginate, not narrower than the base, sides moderately arcuate, margin not crenulate, basal marginal line distinct and entire, surface shining, punctures moderate in size, rather sparsely placed, but evenly disposed over the entire surface. Scutellum with very few punctures. Elytra not wider at base than the thorax, shining, surface coarsely not closely punctate, sutural costa moderately elevated, the oblique costa scarcely evident, a vague lateral costa a little more distinct. Pygidium very coarsely but sparsely punctate, especially near the apex. Prothorax beneath with very few punctures. Metasternum closely punctate at the sides, very sparsely at middle, finely sparsely villous. Abdomen coarsely, sparsely punctate. Length .60 inch; 15 mm.

Male.—Antennal club as long as the funicle. Spurs of hind tibiæ free, the inner twice as long as the outer. Fifth ventral segment slightly flattened at middle.

Female.—Antennal club a little shorter. Spurs of hind tibiæ nearly equal.

Collected in Arizona by Morrison.

P. robustus n. sp.—Facies robust, nearly that of *Lach. crassissima*, brown, feebly shining. Head coarsely rugosely punctured, clypeus very slightly emarginate. Thorax narrower in front, sides moderately arcuate, as wide at base as at middle, lateral margin not crenulate, basal marginal line distinct at the sides, hind angles rectangular; surface feebly shining, moderately punctate, the punctures closely placed and equally disposed over the entire surface, very sparsely pubescent. Scutellum coarsely punctate. Elytra very little wider at base than the thorax, coarsely and moderately closely punctate, the sutural and oblique costæ feeble. Pygidium obsoletely punctate, the punctures very shallow but variolate. Body beneath sparsely punctured, the metasternum villous. Length .80 inch; 20 mm.

Digitized by Google

Male.—Antennal club nearly as long as the entire stem. Outer spur of hind tibiæ short, stout and fixed. Abdomen vaguely concave at middle.

In this species the claws are unequally cleft, the upper portion being much more slender and shorter than the lower portion. As in all the species in our fauna the antennæ are 10-jointed. This species differs from all those described from Mexico by the very equally and rather closely punctured thorax.

One specimen in my cabinet from the Berlandiere collection made along the Rio Grande, and may possibly have been collected on the Mexican side of the river at Matamoras.

The antennæ in this species are rather short, resulting from the fact that the third joint is the only one elongate, the 4–7 being short and quite transverse. The post-coxal elevation of the prosternum is broad and feebly emarginate. The head is rather large and broad, recalling those of the Lachnosternæ allied to *longitarsis*, which this species resembles in form but not in color. The claws are so cleft that the upper portion is as large as the lower and somewhat longer.

Occurs in New Mexico and Arizona.

P. pallidus n. sp.—Form oblong, a little more slender than *Lach. glaberrima*, color testaceous, the elytra a little paler. Head darker in color, coarsely, densely and rugosely punctured, clypeus feebly emarginate. Thorax a little more than twice as wide as long, a little narrower in front, sides moderately arcuate, margin not crenulate, base with a faint trace of marginal line near the hind angles, surface shining, punctures moderately coarse sparsely placed, and regularly disposed. Elytra scarcely wider than the thorax, sparsely, rather coarsely punctate, smoother near the apex, the sutural costa moderately distinct, the oblique discal and submarginal obliterated. Pygidium coarsely sparsely punctate, shining. Prothorax beneath very sparsely punctate. Metasternum moderately closely punctured at the sides, very sparsely at middle, clothed with short sparse hair. Abdomen very finely sparsely punctate at middle, more coarsely at the sides. Length .56 inch; 14 mm.

The male of this species is unknown to me. The female has the antennal club about as long as the funicle. The spurs of the hind tibiæ are both free and nearly equal in length. The post-coxal elevation of the prosternum is broad and vaguely emarginate at tip. The claws are equally cleft, the two portions being similar.

Occurs in Arizona.

P. vexatus n. sp.—Oblong, yellowish testaceous. Head darker, coarsely and moderately closely punctate, clypeus feebly emarginate, less closely punctured than the front. Thorax not more than twice as wide as long, narrower in front, sides arcuate, margin entire, basal marginal line absent, surface shining, moderately coarsely but sparsely punctate, the punctures somewhat irregularly disposed. Elytra a little wider at base than the thorax, moderately coarsely and sparsely punc-

Digitized by Google

tate, smoother near the apex, sutural costa feeble, discal costa obsolete. Pygidium very sparsely and vaguely punctate. Prothorax beneath coarsely and sparsely punctate. Metasternum coarsely sparsely punctate at middle and sides. Abdomen nearly smooth at middle, vaguely punctate at the sides. Length .48 inch; 12 mm.

In this species the third and fourth joints of the antennæ are equal and moderately long. The tip of the prosternum is broadly emarginate. The two portions of the cleft claws are nearly equal.

This species is less elongate than *pallidus;* has the head much less rugulose, and the thorax a little more irregularly punctured.

One specimen ♀, Texas.

P. debilis n. sp.—Oblong, rather slender, pale yellowish testaceous. Head coarsely not closely punctate, clypeus feebly emarginate: eyes rather large and prominent. Thorax a little more than twice as wide as long, narrower in front, sides moderately arcuate, margin entire, base without marginal line, disc moderately convex. coarsely, rather sparsely, equally punctate. Elytra very little wider than the thorax, coarsely sparsely punctate, a little smoother at apex, sutural costæ feeble, oblique discal and submarginal costæ obsolete. Pygidium obsoletely coarsely and very sparsely punctate. Prothorax sparsely punctate beneath, the apex of prosternum deeply emarginate, the angles prolonged. Metasternum nearly smooth at middle, coarsely sparsely punctate at the sides. Abdomen very sparsely punctate at the sides. Length .42 inch; 10.5 mm.

Male.—Antennal club longer than the funicle. Posterior tibial spurs free, the inner a little shorter. Penultimate ventral segment with a small slightly roughened space near the posterior margin.

The two divisions of the cleft claw are equal. This species resembles the preceding, but is more slender and with a more sparsely punctate head. In general appearance it resembles *Lach. inana.*

Occurs in Arizona, near Tucson.

In a general review of the preceding species two may be said to have a relatively small head: *robustus* and *vexatus*, while the others have a large head. The two Mexican species in the table have a small head, both have the posterior tibial spurs free in the male, one (*lævigatus*) has a long antennal club, the other (*pubicollis*) a short club.

P. georgianus n. sp.—Form slender, moderately elongate, testaceous, head piceous. Head coarsely, deeply and closely punctate; clypeus short, margin reflexed, feebly emarginate; eyes large and prominent. Thorax short, more than twice as wide as long, widest at middle, apex very little narrower than the base, basal marginal line not present, disc with coarse and deep, rather sparsely but regularly placed punctures. Elytra not wider at base than the thorax, sides very little arcuate, oblique costal obsolete, submarginal costa feeble, surface coarsely not closely punctate. Pygidium coarsely sparsely punctate. Prothorax beneath coarsely sparsely punctate, the post-coxal process very deeply emarginate, the angles prolonged. Sides of metasternum and abdomen sparsely punctate. Length .50 inch; 12.5 mm.

Digitized by Google

Male.—Antennal club longer than all the preceding portion. Spurs of hind tibiæ free, the inner much longer than the outer. Last ventral segment vaguely concave.

The claws are slender, the upper portion longer than the lower. This species resembles *Lachnosterna volvula* so closely that one might readily be mistaken for the other.

One specimen, Georgia. Morrison.

LISTROCHELUS Blanch.

L. flavipennis n. sp.—Subcylindrical, moderately elongate, head and thorax rufo-testaceous, elytra yellowish testaceous, surface shining. Head coarsely not closely punctate, clypeus at middle smoother, its anterior margin subtruncate and narrowly reflexed. Thorax transverse, widest at middle. the sides very obtusely subangulate, the margin not crenulate, and with rather distantly placed short stiff setæ, surface shining, very sparsely punctate, the punctures a little closer along the apical margin. Elytra coarsely sparsely punctate, sutural costa feebly elevated the oblique discal costa scarcely evident. Pygidium convex, very sparsely, coarsely punctate. Metasternum yellowish testaceous, moderately closely punctate, clothed with fine silken pubescence. Abdomen pale piceo-testaceous, very sparsely punctate at the sides, granulate along the middle. Length .60 inch; 15 mm.

Male.—Club of antennæ long and slender. Abdomen longitudinally concave at middle, the last ventral segment longitudinally impressed, the penultimate less so. Claws pectinate on all the tarsi, the pectination double. Spurs of hind tibiæ slender.

Female.—Club of antennæ not longer than the funicle. Claws similar on all the feet, very indistinctly serrulate their entire length with moderate tooth at middle.

This species is closely related to *disparilis*, but differs in color, size and sculpture. The pectination of the ♂ claws is also different, being fine and equal in the present species, unequal and partly coarse in *disparilis*.

Collected by Mr. Morrison in Arizona.

L. gracilis n. sp.—Form rather slender cylindrical, rufo-testaceous, surface distinctly pruinose. Head sparsely coarsely punctate, clypeus subtruncate in front, the margin narrowly reflexed. Antennæ nine-jointed, the third and fourth joints being closely connate, club paler but little longer than the funicle. Thorax transverse, wider at base than apex, widest at middle, sides obtusely angulate, the margin crenulate and fimbriate, surface sparsely punctate, punctures less abundant near the hind angles. Elytra not wider than the thorax, sparsely coarsely punctate, sutural costa feebly elevated, oblique discal costa obsolete. Pygidium very sparsely finely punctate. Body beneath, sparsely pilose, the metasternum finely not densely punctate, opaque. Abdomen paler, sparsely punctate. Length .52 inch; 13 mm.

Male.—Anterior claw of front tarsi biseriately finely pectinate, the outer claw more coarsely pectinate with a tooth at middle. Middle claws biseriately pectinate. Posterior front claw biseriately pectinate, the other claw serrate at tip and

Digitized by Google

obsoletely pectinate at base. Last ventral segment with a strongly elevated transverse carina. Posterior trochanters dentiform at tip. Posterior tarsi slender, not pilose beneath.

The sexual characters mark this as a very peculiar species. It is allied in many respects to *scoparius*. The prominence of the hind trochanter has never been observed in any other species. No value is attached to the 9-jointed antennæ, as in *mucorens* it has been observed that specimens seem to be indiscriminately nine or ten jointed.

One male. Arizona.

PLUSIOTIS Burm.

P. Woodii n. sp.—Form oval, robust, surface bright brilliant green with a slight golden lustre from the surface, tarsi violaceous. Head sparsely punctate, clypeal margin narrowly reflexed. Antennæ piceous, basal joint bright green. Thorax not twice as wide as long, a little narrower at apex, broadest at middle, hind angles nearly rectangular, surface sparsely coarsely punctate with finer punctures intermixed, the punctures denser at the sides, especially in front. Scutellum coarsely punctate. Elytra wider at base than the thorax, broadest slightly behind the middle, apical umbones moderately prominent, surface obsoletely striate, nearly entirely obliterated at the sides, striæ punctate, the intervals flat, with coarse sparsely placed punctures with finer punctures intermixed. Pygidium rugulose at the sides, closely not coarsely punctate. Body beneath a little more polished than above, sides of metasternum coarsely punctate. Abdomen much more sparsely and finely punctate. Legs bright green, tibiæ distinctly golden externally. Length 1.–1.12 inch; 25–28 mm.

The male has the anterior claw longer than the posterior on each tarsus as is usual, but that of the front tarsus is suddenly acuminate near the tip.

This species is easily known from either of our other species, *gloriosa* having sulcate elytra, and *LeContei* deeply striate elytra. The elytral sculpture resembles that of Chrysina.

Two specimens from the Rio Grande, Texas, collected by my friend, Dr. H. C. Wood, to whom I have great pleasure in dedicating the species. I have seen another specimen in the Museum of the Jardin des Plantes at Paris.

ORIZABUS Fairm.

O. Snowii n. sp.—Dark castaneous, moderately shining, beneath moderately densely clothed with short, reddish brown hair. Head densely punctured and opaque, frontal suture arcuate, clypeus in front reflexed, on each side more elevated so as to be bidentate, at middle close to the frontal suture elevated in a slight tubercle. Thorax about one-third wider than long, narrower in front, sides arcuate, hind angles broadly rounded, lateral margin fimbriate with short hairs, base with a distinct and entire marginal line, surface coarsely and very densely punctured near the anterior angles from which point the punctures become gradually finer, the middle of the disc being very finely and sparsely punctured;

Digitized by Google

disc behind the anterior margin with a slight depression in front of which is a slight pyramidal elevation of the margin, flat and smooth in front. Elytra wider than the thorax, about one-fourth longer than wide, scarcely broader behind, surface vaguely seven-striate, with large variolate punctures rather closely placed, the fouth and sixth intervals wider with irregular variolate punctures with others at the base of the second interval, sides of elytra beyond the seventh row of punctures, coarsely and irregularly punctured. Pygidium sparsely and rather finely punctate. Abdomen smooth at middle, coarsely punctured at the sides. Anterior tibiæ with the outer edge regularly arcuate the anterior face coarsely punctured (except along the outer margin) and with a carina extending nearly the entire length; tip of tibia obtuse. Length .8 inch; 21 mm. (Pl. 4, fig. 5.)

The genus Orizabus was founded by Fairmaire (Rev. et Mag. Zool. 1878) for certain Mexican forms closely related to the Australian Chiroplatys, and from which no characters of moment have been given to separate them. In our own fauna Ligyrus and Aphonus are its closest allies, and the species resemble those genera greatly in form and sculpture. The anterior tibiæ in the species described by Fairmaire are without teeth on the outer side, but in one of them, *isodonoides*, the following expression is used: *tibiis anticis . . . extus leviter bisinuatis.* This latter expression indicates a tendency of the tibia to become dentate, which the following species fully illustrates.

The two specimens before me were collected by Prof. Snow in New Mexico. Of the four species described by Fairmaire they seem most closely related to *marginatus.*

O. ligyroides n. sp.—Dark castaneous, shining, beneath clothed with short reddish brown hair. Head densely punctured and opaque, frontal suture sinuate, clypeus in front narrow, the margin reflexed and acutely notched, obtusely bidentate, a slight elevation at the middle of the clypeal suture. Thorax about one-third wider than long, narrower in front, hind angles broadly rounded, sides fimbriate, base with a distinct marginal line; apical margin thickened and slightly elevated at middle, surface coarsely and rather densely punctured along the apical third, gradually more sparsely posteriorly, a smooth median space posteriorly and one each side nearer the lateral margin. Elytra wider than the thorax, scarcely a fourth longer than wide, slightly broader posteriorly, the surface with seven vague striæ indicated by rows of coarse variolate punctures, the intervals 2–4–6 broader and with irregularly placed punctures, sides of elytra beyond the seventh row of punctures coarsely and deeply punctured, the punctures arranged in vague rows. Pygidium very finely and sparsely punctured. Abdomen finely and sparsely punctate. Anterior tibiæ coarsely punctured, except along the outer margin and apex, a distinct carina extending from base two-thirds to tip, outer edge vaguely tridendate. Length .88 inch; 22 mm. (Pl. 4, fig. 6.)

In comparing this species with *Snowii* we find the form more robust, the sculpture throughout deeper and more pronounced. The thorax is not depressed in front and the apex of the clypeus narrower.

Digitized by Google

It is, however, in the form of the anterior tibiæ that the greatest difference is observed as is shown in the accompanying figure. From the facies of the species and all the other characters there seems to me no doubt that it should be placed in the present genus, and the structure of the tibiæ of one of the species already quoted seems to indicate the occurrence of another with the form of tibiæ of the one now before me. In the present species it will be observed that the submarginal rows of setigerous punctures of the ventral segments 3–4–5 are better marked than in *Snowii*.

One specimen collected by Mr. Morrison in Arizona.

CREMASTOCHILUS Knoch.

In a review of our species of this genus published by me (Proc. Am. Philos. 1879, pp. 382–397) there is indicated a peculiar type represented by one species (*saucius*) in which the clypeus is strongly longitudinally carinate at middle and the thorax trilobed on the disc. One other species (*planatus*) has the clypeus carinate, but with the disc of thorax entire, still another (*Wheelerii*) has the disc trilobed, but without clypeal carina. In all the species with widely reflexed clypeus, especially the group below, the surface of the clypeus above is quite smooth and shining.

The occurrence of two new species enables me to define a small group with the following characters: Mentum plate rather flat, the margins narrowly reflexed, more widely posteriorly, hind angle of mentum entire; head rapidly narrower behind the eyes, the clypeus strongly carinate at middle; disc of thorax trilobed.

The species thus included are as follows:

Tibiæ of normal form, rather thick, more slender at base; hind tibiæ with a small tooth at middle.

Anterior tibiæ with the upper tooth near the middle; hind angles of thorax small, acute, not everted. **saucius** Lec.

Anterior tibiæ with both teeth near the apex; hind angles of thorax rather long, slender and everted. **spinifer** n. sp.

Tibiæ broad, laminiform and thin, not much narrower at base, middle and hind tibiæ toothed near the tip.

Anterior tibiæ with both teeth near the apex; hind angles of thorax acute, but short. **planipes** n. sp.

C. spinifer n. sp.—Piceous, slightly shining. Head coarsely not densely punctured, the occipital region transversely depressed; clypeus, viewed from above, nearly semi-circular, margin widely reflexed, at middle very strongly carinate, surface smooth. Thorax wider than long, narrower behind, sides arcuate in front, sinuate posteriorly, the hind angles acute and prolonged externally, anterior

Digitized by Google

angles with a deep incision forming in front an auriculate lobe, disc trilobed, the median portion being somewhat depressed, surface very coarsely but sparsely punctured. Elytra with disc flat, sides nearly vertical, discal region with shallow, elongate foveæ, the sides with coarse punctures. Pygidium coarsely sparsely punctate. Body beneath shining, with very coarse but sparse punctures. Legs brownish, anterior tibiæ obtusely bidentate near the apex, middle and posterior tibiæ acutely dentate near the middle. Tarsi ambulatorial, cylindrical, slightly compressed; and but little shorter than the tibiæ. Length .30 inch; 7.5 mm. (Pl. 4, fig. 1.)

In the plate is an outline sketch of this species which will serve better than a description to give an idea of its curious form. The mentum is rather deeply cupuliform, smooth, the hind angles entire.

One specimen, Texas.

C. planipes n. sp.—Robust, piceous, feebly shining, legs reddish brown. Head coarsely, not densely punctate, occipital region transversely depressed, clypeus semi-circular, margin widely reflexed and fimbriate with short hairs, at middle strongly carinate, surface smooth. Thorax transverse, narrower behind, sides slightly arcuate in front, oblique behind, hind angles acute, smooth and shining, anterior angles deeply incised forming an auriculate lobe, disc trilobed, the median portion much wider and depressed, surface with rather closely placed variolate foveæ, densely placed near the side margin. Disc of elytra flat, with very elongate foveæ, sides nearly vertical with coarse variolate punctures. Pygidium with coarse variolate punctures. Body beneath coarsely sparsely punctured. Legs broad and flat, sparsely punctured on the under side, smooth above. Anterior tibiæ bidentate at apex, middle and posterior tibiæ with the outer edge acutely bidentate near the tip. Tarsi cylindrical, slightly compressed, shorter than the tibiæ. Length .52 inch; 13 mm. (Pl. 4, fig. 2.)

The punctures of the entire surface bear short erect black hairs.

In the accompanying plate are figures in outline of the three species which I have associated in one group. Their differences may be seen at a glance. The mentum is rather flat at bottom, the sides reflexed, the posterior angle entire.

One specimen, Arizona.

C. ineptus n. sp.—Black, feebly shining, form relatively elongate. Head coarsely and closely variolate punctate, occiput not transversely compressed, front flat, clypeus narrowly reflexed. Thorax broader than long, general form hexagonal, anterior angles slightly acute, posterior angles obtuse, disc feebly convex, with very coarse, moderately deep and rather closely placed punctures. Elytra with flat disc which has very elongate variolate foveæ, the sides very coarsely punctured. Pygidium with coarse variolate punctures. Legs ambulatorial, relatively slender, anterior tibiæ bidentate near the tip, the middle and posterior toothed at middle and with coarse teeth around the apex. Tarsi nearly as long as the tibiæ, cylindrical. Body beneath very coarsely but sparsely punctate. Length .50 inch; 12.5 mm. (Pl. 4, fig. 4.)

In this species the mentum plate is of pentagonal form, acute posteriorly and entire, rounded in front, surface slightly concave, sparsely

Digitized by Google

punctate, the margins not reflexed. It should be associated with *lencostictus* in the section Brilocnemis. It is a more elongate species than the latter and with a different form and sculpture of mentum.

One specimen from Arizona, kindly given me by Mr. L. E. Ricksecker.

Contributions to the Coleopterology of the United States.

(No 4.)

BY GEORGE H. HORN, M. D.

In the initial paper of the present volume Dr. LeConte remarks that it includes descriptions of nearly all the important material in his collection, and that previous papers by me exhausted nearly all undescribed species in my cabinet.

It has been my custom to avoid, as far as possible, the description of isolated species, except in the case of those belonging to very recently monographed families, allowing the others to accumulate until their numbers render it advisable to prepare essays of a more or less monographic character.

The quantity of new material has at last become too great to neglect and the present contribution has been prepared, at the same time the principle above mentioned has been almost strictly adhered to. Several portions which were originally part of the present paper have been separated under independent titles more expressive of their contents.

The typical specimens of all the new species which follow are in my cabinet.

CARABIDÆ.

CALOSOMA Weber.

C. Morrisonii n. sp.—Black, moderately shining. Head moderately closely punctate, rugulose at the sides, mandibles transversely wrinkled. Thorax twice as wide as long, base and apex nearly equal, sides strongly arcuate in front, oblique behind, hind angles very obtuse, lateral margin narrow in front, more widely reflexed posteriorly, the basal impressions moderately deep, apex feebly, base more distinctly emarginate, median line distinct, surface moderately closely punctate and more rugulose at the sides and along the base. Elytra oval, widest behind

Digitized by Google

the middle in both sexes, humeri distinct, surface rather shining, with about fifteen rows of rather fine not closely placed punctures, the intervals with a single row of finer and more distant punctures, the fourth, eighth, twelfth and submarginal intervals with a series of moderately distant larger golden punctures. Prothorax beneath sparsely punctate, metathorax at sides more coarsely, abdomen sparsely punctate at the sides. Length .72–.80 inch: 18–20 mm.

The male has three joints of the anterior tarsi spongy pubescent beneath. This species from the evident golden elytral spots must be associated with *calidum* and *tepidum*, than either of which it has much smoother elytral sculpture although resembling them in general form. It might be mistaken for a smooth variety of *obsoletum*, but the elytra are more dilated, their sculpture smoother, and without the imbricated appearance. The base of the thorax is distinctly bisinuate in *obsoletum* and simply emarginate in the present species as well as in those with which it is associated.

Collected by Mr. H. K. Morrison in Colorado. With it I associate his name as an evidence of my appreciation of his industry and success in adding to a knowledge of our fauna.

STOLONIS Motsch.

The occurrence of a species of this genus within our faunal limits is rather unexpected, as none have as yet been found north of Yucatan.

Stolonis was rather insufficiently described by Motschulsky (Bull. Mosc. 1865, ii, p. 230), but to Mr. H. W. Bates we owe a fuller exposition of its characters in his usual able manner (Ent. Mo. Mag. viii, p. 148). Chaudoir gives some additional information regarding species apparently unknown to Mr. Bates (Bull. Mosc. 1873, p. 85).

There can be no doubt of the correctness of the views of Bates and Chaudoir in associating Stolonis with Loxandrus. The three glabrous antennal joints and the elytral plica are sufficient to indicate its position in the Pterostichini. The anterior tarsi are obliquely dilated in the males as in Loxandrus, although Chaudoir says this is very feebly evident in the smaller species. The elytra have one dorsal puncture on the third interval rather closer to the second stria, there is no scutellar stria. Chaudoir indicates the only positive and permanent character which will distinguish Stolonis and Loxandrus. In the former the thorax is strongly constricted at base forming, as it were, a neck. The acute margin of the thorax does not extend on this neck.

S. Ulkei n. sp.—Piceous black, shining, iridescent. Head smooth, a deep frontal impression each side, and a slight trace of a vertical fovea. Antennæ slender, basal joint testaceous, 2–6 piceous, 7–11 white. Thorax cordate, sides

Digitized by Google

strongly arcuate, strongly constricted at base, surface smooth, median line rather deeply impressed, subapical impression feeble, a few coarse punctures along the base, especially near the hind angles, which are rectangular. Elytra oval, humeri rounded, surface moderately deeply striate, the striæ crenately punctured, intervals very slightly convex, the sutural interval behind the middle and the lateral margin of the elytra ferruginous. Body beneath smooth, shining, iridescent. Legs pale yellowish testaceous. Length .24 inch; 6 mm. (Pl. 4, fig. 1.)

It is not without some hesitation that I give this species a name. The description of *S. intercepta* Chaud. from Yucatan, fits very accurately the species before me, but being rather a comparative than a didactic description it is impossible to ascertain.

One ♀ specimen from Texas. I have seen another in the cabinet of Mr. Ulke.

PLATYNUS Bon.

P? quadrimaculatus n. sp.—Rufo-testaceous, sides of abdomen piceous, head black, elytra black with a large humeral spot confluent with that on the opposite side, another very little smaller near the apex. Head oval, eyes distant from the thorax, surface subopaque, finely alutaceous, a few punctures near the occiput. Thorax somewhat cordiform, a little longer than wide, narrower at base, apex feebly emarginate, base truncate, sides in front arcuate, posteriorly sinuate, hind angles rectangular but not prominent, an extremely narrow reflexed margin, disc very slightly convex, basal impressions shallow but nearly reaching the middle, median line finely impressed, surface subopaque, alutaceous, very sparsely finely punctate. Elytra oval, broader behind, humeral angles much rounded (body feebly winged), striate, striæ obsoletely punctured, intervals flat, alutaceous, dorsal punctures three, on the third interval close to the third stria. Body beneath more shining than above, almost entirely smooth. Metasternal episterna moderately long. Tarsi slightly hairy on the upper side, without tarsal grooves. Length .30 inch; 7.5 mm. (Pl. 5, fig. 2.)

Female.—Tarsi slender, fourth joint scarcely emarginate. Last ventral with three setæ each side at apex.

I place the very pretty species above described in Platynus for want of knowledge of a better place. While all the essential characters are those of that genus, the slightly hairy upper side of the tarsi is at variance, this in connection with the style of coloration makes the species rather an anomaly in the genus. The general form of body and the long basal impressions of the thorax are very like some of the apterous Platyni (e. g. *jejunus*). The male might give some additional characters and lead to the formation of a new genus, which I suppose will have to be done.

I have seen but one specimen kindly sent me by Dr. John Hamilton, of Allegheny, collected by Mr. Klages "Feb. 27, 1881, under the bark of a fallen gum tree near Owensburgh, Ky." (banks of the Ohio, near Louisville.)

Digitized by Google

GALERITA Fab.

G. decipiens n. sp.—Form of *Janus*. Head, palpi antennæ, body beneath and legs black. Thorax reddish yellow, elytra decidedly bluish. Head oval, very broad behind the eyes, coarsely and densely punctate. Thorax as in *Janus*, oval, narrowed behind, broadest in front of middle, hind angles very obtuse, surface rather densely and coarsely punctate. Elytra oval, rather depressed, black, surface decidedly blue, especially at the sides, striate, striæ distantly punctured, intervals rather coarsely, closely and roughly punctate, sparsely pubescent. Body beneath more shining, less closely punctate and more sparsely pubescent. Length .70 inch; 18 mm.

The colors of this species are those of *atripes*, except that the elytra are more distinctly blue. From that species it is known by the form of the head. Two species, *atripes* and *bicolor* have the head rapidly narrower from the eyes to the neck, the present species has more nearly the form of head of *Janus*.

Occurs in Arizona.

LEBIA Latr.

L. montana n. sp.—Beneath and head black, thorax red, elytra dark blue, or with a slight greenish tinge. Antennæ slender, piceous, two basal joints and part of the third red. Head very sparsely finely punctate, rather abruptly narrowed behind the eyes. Thorax red, twice as wide as long, median line finely impressed, very little narrower behind, margin narrower in front, broader behind, hind angles rectangular, surface finely transversely wrinkled. Elytra very finely striate, striæ obsoletely punctured, intervals flat, very finely alutaceous, dorsal punctures two on the third interval near the third stria. Abdomen very sparsely punctate. Legs piceous or piceo-testaceous. Length .22 inch; 5.5 mm.

This species belongs to that division of Lebia defined by Chaudoir as Lebia proper. By its general appearance it is most closely related to *viridipennis*. The latter has a yellow under body, and the legs, except the knees and tarsi, are yellow. The elytral striæ are, in *montana*, a little more distinct. The only other species similarly colored is *atripennis*, which has the metathorax red, and belongs to a different section of the genus.

Occurs in Montana.

L. lecta n. sp.—Body beneath, head, thorax, legs and antennæ pale rufo-testaceous, abdomen piceous, elytra metallic green. Head suddenly narrowed immediately behind the eyes, surface alutaceous, impunctate. Antennæ slender, entirely rufo-testaceous. Thorax very little narrowed behind, margin rather broad, wider posteriorly, hind angles rectangular, median line finely impressed, surface alutaceous and transversely wrinkled. Elytra entirely metallic green above, the epipleuræ rufo-testaceous, surface rather deeply striate, striæ finely punctured, intervals slightly convex, alutaceous. Abdomen nearly smooth, the punctures sparse and very distant. Fourth joint of hind tarsi very deeply bilobed. Length .14 inch; 3.5 mm.

Digitized by Google

The specimen before me is a female, and I cannot determine, with absolute certainty, whether the species belongs to the Loxopeza or Lebia series. The fourth hind tarsal joint being very deeply bilobed it is more than probable that it is a true Lebia, and should be placed near *pleuritica*. It is a much smaller species than any in our fauna except *pumila*, and resembles a diminutive *pleuritica* in color except that in the latter the side margin of the elytra is narrowly pale.

One specimen, Florida, given me by Mr. W. H. Ashmead.

L. scapula n. sp.—Antennæ rufo-testaceous. Head rufo-testaceous, sparsely finely punctate. Thorax similar in color, transverse, slightly narrower behind, margin moderately wide, wider near the hind angles, which are rectangular, surface slightly transversely wrinkled. Elytra piceous, almost black, with a large rufo-testaceous humeral spot which extends in a point on the fifth interval, and is prolonged narrowly along the side to the apical margin, surface striate, not punctate, intervals slightly convex. Body beneath and legs rufo-testaceous. Abdomen piceous, sparsely punctate. Length .22 inch; 5.5 mm.

From its style of coloration this species resembles *L. xanthopleura* Chd., as figured by Mr. Bates (Biol. Cent. Am. vol. i, pt. 1, pl. xi, fig. 9). It is, however, a smaller species, with a differently formed thorax, and without the humeral piceous spot. The figure (Pl. 5, fig. 10) will give an idea of the markings. It should be placed among the Lebiæ, although the mentum tooth is indistinct. It is the only true Lebia in our fauna with ornate elytra having a pale head.

One specimen, Arizona.

L. vivida Bates, Biol. Cent. Am. vol. 1, pt. 1, p. 298.—Rufo-testaceous, not shining. Head black, apical half and narrow basal margin of elytra blue. Antennæ piceous, basal joints somewhat paler. Head black with slight tinge of blue, moderately coarsely but not closely punctate. Thorax transverse, slightly narrower posteriorly, margin moderately wide, broader at the hind angles which are rectangular, surface rather coarsely punctate and wrinkled. Elytra striate, the striæ not visibly punctate, intervals flat, rather coarsely sparsely punctate and alutaceous, basal margin narrowly blue-black, apical half blue-black, the anterior margin of the latter space irregular. Body beneath shining, very sparsely punctate. Femora and tarsi almost black, tibiæ paler, sometimes testaceous. Length .22 inch; 5.5 mm.

The accompanying sketch (Pl. 5, fig. 7) will give an idea of the style of marking of this species. By its color and the rather coarse punctuation of the surface is very distinct from any species in our fauna. In our series it should be placed with *divisa* after *bitæniata* and *pulchella*.

Two specimens, Arizona.

This species is referred by Mr. Bates to *Metabola*, and as I have already expressed the opinion that Lebia has been very artificially and unnecessarily divided, I prefer to retain the name Lebia alone.

Digitized by Google

L. depicta n. sp.—Rufo-testaceous, legs entirely and antennæ, except first joint, black, elytra conjointly with three black stripes, the sutural bifurcate at the base. Front sparsely punctate, at the sides and posteriorly slightly wrinkled. Antennæ nearly black, the basal joint rufo-testaceous. Thorax very little narrowed behind, the margin rather wide, wider posteriorly, hind angles rectangular, median line finely impressed, surface wrinkled and more rugulose near the side margin. Elytra finely striate, striæ obsoletely punctulate, intervals slightly convex, very finely alutaceous, general color pale yellow, a common black sutural vitta which occupies the two inner intervals on each elytron, except a short distance at tip, and bifurcate about one-third from the base, on each elytron a vitta beginning at the shoulder occupying the sixth and seventh intervals, becoming a little broader near the apex. Legs and palpi entirely black. Length .26 inch; 6.5 mm. (Pl. 5, fig. 6.)

This species belongs to the Aphelogenia group of Lebia, characterized by the absence of mentum tooth. In its markings it resembles *furcata*, but differs from all our species in this series with wide thoracic margin by its entirely black legs.

Occurs in Montana.

L. vittata Fab. var. *Spraguei* Horn (Pl. 5, fig. 9).

The variety above indicated is that form in which nearly the entire disc of the elytra, except a narrow side margin and apex, is black. I have now specimens from Georgia which correspond in every particular with the figure given by Chaudoir in his monograph (Bull. Mosc. 1871, i, p. 40, Pl. 3, fig. 127). The typical form of *vittata* has some resemblance to *scapularis*, but there are many characters separating these. *L. conjungens* Lec. is really a variety of this species.

L. pectita pro *vittata* ‡ Horn nec Fab. (Pl. 5, fig. 5.)

In consequence of the correct determination of the preceding species it becomes necessary to change the name of the present. It is also a vittate species, but the common sutural vittata reaches the apex but does not bifurcate at base; the outer vitta is abbreviated at base and apex, limited within by the fourth stria, extending over three intervals (5–6–7), but narrower toward the apex.

Our species of the division *Aphelogenia* separate into two natural series: (1) those with the thorax widely margined, and (2) those with a very narrow margin. The first series contains the following species:

Body beneath pale; head and thorax similar in color.
  Elytra with the sutural vitta bifurcate at base.
    Femora in great part rufo-testaceous, sutural vitta bifurcating one-third from base..... **furcata** Lec.
    Legs entirely black, sutural vitta bifurcating very near the base.
      depicta n. sp.
  Elytra with sutural vitta not bifurcate.

Digitized by Google

Elytra in great part black, with (at most) a narrow side margin, apex, and slender oblique stripe yellow.....**vittata** Fab.

Elytra in great part yellow, sutural black vitta beginning at the apex but not reaching the base, the lateral vitta short.....**pectita** n. sp.

From Chevrolat's description of *flavovittata* it seems related rather to *scapularis* than to *vittata*.

CHLÆNIUS Bon.

C. insperatus n. sp.—Totally black. Head nearly smooth. Thorax transverse, a little wider at base than apex, sides moderately arcuate, feebly convex, surface coarsely punctured, the punctures rather irregularly placed, being denser along the base. Elytra a little wider than the thorax, basal marginal line not angulate at the humeri, surface finely striate, striæ with distant punctures, intervals flat not closely punctate, pubescence fine and black. Prothorax beneath smooth, prosternum distinctly margined. Metasternum and side pieces with very coarse distant punctures, met-episterna longer than wide in front. Abdomen smooth at middle, sparsely punctate at the sides, not pubescent. Length .50 inch; 13 mm.

The male has the first three joints of the anterior tarsi dilated, the middle tibia not pubescent externally at tip. By the arrangement proposed by me (Trans. Am. Ent. Soc. v. 255) this species must be referred to the division A, in which the males have middle tibiæ not pubescent externally. By its impunctured abdomen it is more closely related to *tomentosus*, but in its general appearance it resembles a large *purpuricollis*. It differs from the latter as well as from all those with a broad thorax by the prosternum margined at tip.

Occurs in Arizona.

BRACHYLOBUS Chd.

B. caurinus n. sp.—Beneath piceous, above bright green, sparsely clothed with short fulvous pubescence. Antennæ piceous, three basal joints pale. Head shining, sparsely punctate, the vertex nearly smooth. Thorax about one-half wider than long, base slightly wider than apex, sides arcuate, very slightly sinuate in front of the hind angles, which are nearly rectangular, median line moderately impressed, a short longitudinal impression each side in front of base, surface coarsely and moderately closely punctate, especially near the base. Elytra regularly oval, very little wider than the thorax, nearly twice as long as wide, surface opaque, finely striate, intervals flat, closely submuricately punctate. Body beneath shining, the thoracic segments coarsely punctate. Abdomen more finely punctate over its entire surface. Femora piceous, tibiæ and tarsi testaceous. Length .36 inch; 9 mm. (Pl. 5, fig. 3.)

A more elongate species than *B. lithophilus* (Pl. 5, fig. 4), which it, however, resembles in general appearance. In the present species the thorax is very little wider at base than the apex and the hind angles well

Digitized by Google

defined, while in *lithophilus* the base is much wider than the apex and the hind angles obtuse or rounded. The latter species has entirely pale legs.

One specimen ♂, kindly given me by Prof. Wm. Duenkel, which was collected by him near Yreka, Cala.

STAPHYLINIDÆ.

OXYPORUS Grav.

O. austrinus n. sp.—Black, shining, elytra testaceous with the suture and outer apical angle black. Legs pale yellow, the knees and tips of tibiæ narrowly piceous. Antennæ piceous, but somewhat paler at base. Thorax broader than long, narrower at base, widest in front of middle, sides arcuate. Elytra longer than the thorax, conjointly wider than long, slightly wider behind, with a subsutural and two discal punctured striæ, all very regular with but few irregular punctures between them, surface smooth, the outer apical angles finely rugose. Abdomen smooth, with the usual two dorsal punctures on each segment, beneath shining with fine scattered punctures. Length .26–.30 inch; 6.5–7.5 mm.

This species resembles *vittatus*, but should be placed near *femoralis* from the finely rugose apical angles of the elytra; it differs from the latter, however, by the smaller size and entirely pale legs.

I have seen five specimens collected near Savannah, Ga., by Mr. Geo. Noble.

O. occipitalis Fauvel.

This species is mentioned to note its occurrence in Washington Territory.

O. fasciatus Mels. Proc. Acad. ii, p. 40.—Head variable in color, sometimes entirely black, usually rufo-testaceous with the front and sides black. Thorax transverse, narrower behind, sides arcuate, broadest at or behind the middle, color rufo-testaceous, apical and basal margins black. Elytra wider than the thorax, conjointly wider than long, slightly broader behind, very shining, rufo-testaceous, suture and outer apical angles black, subsutural series of punctures regular, the two discal rows somewhat irregular. Abdomen shining, terminal segment pale, fourth and fifth above and beneath entirely piceous, the second and third pale but brownish at base. Abdomen beneath rufo-testaceous except the fourth and fifth segments. Legs testaceous. Length .28–.34 inch; 7–8.5 mm.

This species has been quoted in all the books as a variety of *vittatus*, even by Melsheimer, but I am convinced that it is fully entitled to be retained as distinct, from the great uniformity of the color of the specimens before me, as well as in the shorter and broader thorax. If it must be admitted as a variety then *vittatus*, *bicolor* and *occipitalis* must also be considered varieties of one, and the entire aggregate of four called *vittatus*.

Abundant in the District of Columbia, taken by Mr. Ulke.

Digitized by Google

SILPHIDÆ.

ECHINOCOLEUS n. g.

Form convex, oboval, narrower behind. Head as in *Choleva*. Antennæ short, almost entirely glabrous, last joint pubescent at apical half; first joint cylindrical, narrower at base, second oval, joints 3–11 gradually wider, those from 3–8 gradually shorter and more transverse, eighth as wide as the seventh and ninth and a little shorter, joints nine and ten nearly equal, as wide as long, eleventh longer, oval at tip. Maxillary palpi with last joint elongate conical as long as the preceding joint. Middle coxæ slightly separated, the mesosternum not carinate; posterior coxæ contiguous. Tibiæ spinulose externally, spurs slender and moderately long.

The genus for which the above name is proposed is closely related to Choleva, and differs especially in the form and structure of the antennæ. In this respect it resembles *Catopomorphus*, from which it differs by the non-carinate mesosternum and the form of the terminal joint of the palpi.

E. setiger n. sp.—Broadly oboval, narrower behind, pale castaneous, feebly shining. Head finely punctulate, sparsely finely pubescent, with short, semi-erect setæ intermixed. Thorax very transverse, more than twice as wide at base as long, apex subtruncate, sides arcuately narrowing to the front, base broadly emarginate, the hind angles rectangular not prolonged, surface extremely finely punctulate and with fine brownish pubescence, with semi-erect setæ intermixed. Elytra as wide at base as the thorax, sides rapidly arcuately narrowing to the apex, the two apices conjointly rounded, sutural stria distinct, abbreviated in front, surface minutely punctulate, the punctures arranged in strigæ slightly oblique, surface finely pubescent with short semi-erect not closely placed setæ arranged in about eleven series on each side. Body beneath sparsely punctate with coarser pubescence than above. Length .11 inch; 2.75 mm.

This species resembles in form *Ptomaphagus brachyderus* (Trans. Am. Ent. Soc. 1880, Pl. v, fig. 16), but is more arcuately narrowed posteriorly.

Two specimens, Arizona.

CHOLEVA Latr.

C. alsiosa n. sp.—Oblong, rather slender, piceous, subopaque, elytra slightly fuliginous. Head rather coarsely but not closely punctate, finely pubescent. Antennæ rather slender, longer than the head and thorax, piceous, the two basal joints somewhat paler. Thorax less than twice as wide as long, narrower in front, sides moderately arcuate, hind angles not rectangular, rather obtuse, surface slightly shining, moderately densely and finely, sub-muricately punctured and finely pubescent. Elytra elongate oval, as wide at base as the base of the thorax, gradually narrowing to apex, sutural stria fine abbreviated at base, surface opaque moderately densely punctate and finely pubescent, the punctures coarser than the thorax. Body beneath moderately closely punctate, finely pubescent. Legs piceous, tips of tibia and tarsi rufescent. Length .16 inch; 4 mm.

Male.—First three joints of the anterior tarsi and the first of the middle dilated. Under side of front femora flattened, slightly longitudinally concave, without tubercle.

Digitized by Google

This species, the most elongate and narrow in our fauna, might be mistaken for a small *Prionochæta opaca*. Among our species of this genus it is most closely related to *C. luridipennis*, but is longer and differently colored and punctured.

One male given me by Mr. Ulke, from the Yukon River, Alaska.

PTOMAPHAGUS Illig.

P. fissus n. sp.—Form *Mordella*-like, color pale brownish, very finely pubescent. Head minutely, moderately closely punctate. Thorax nearly twice as wide at base as long, much narrowed in front, sides slightly arcuate, hind angles rectangular, disc moderately convex, very finely and rather closely transversely strigose-punctulate. Elytra as wide at base as the thorax, a little more than twice as long as it, sides feebly arcuately narrowing to apex, the apices slightly obliquely truncate, sutural stria rather deeply impressed, surface moderately closely and very obliquely strigose. Body beneath finely not closely punctulate. Middle and posterior tibiæ fimbriate at tip with short, equal, closely placed spinules. Length 10 inch; 2.5 mm.

Male.—Posterior femora slightly angulate-dentate at middle, anterior tarsi dilated.

This species is closely related to *consobrinus* and *californicus*, having sculpture similar to the former and the color of the latter. In both these species the posterior femora are simple in the male. To this species belong the Pacific forms referred by me to *consobrinus*, the insufficiency of material by the absence of males prevented me from considering it distinct.

Occurs in Arizona and California (Owen's Valley).

P. Ulkei n. sp.—Form moderately robust, piceous, clothed with very fine sericeous pubescence. Head minutely punctured. Antennæ rather stout, piceous, apical and two basal joints pale. Thorax one-half wider than long, sides posteriorly scarcely convergent, apical third arcuately narrowing to the front, hind angles acute, slightly prolonged, surface very finely and densely strigose, finely pubescent. Elytra not wider than the thorax, the sides gradually narrowing to the subtruncate apices, sutural stria deeply impressed, entire, surface extremely finely and very closely obliquely strigose, clothed with fine sericeous pubescence. Body beneath finely, sparsely punctate, abdomen more closely and coarsely punctate. Legs piceous. Tibiæ fimbriate at tip with fine, equal, closely placed spinules. Length .15 inch; 3.75 mm.

By its character this species is related to *californicus* and its allies, especially by the dense strigosity to *nevadicus*. It is, however, larger, more robust, darker in color, and with a thorax longer and less narrowed in front than is usual in our species.

One female specimen collected in the District of Columbia by Mr. Ulke, whose name I take pleasure in associating with it as an evidence of my appreciation of his industry and acute observation.

Digitized by Google

HYDNOBIUS Schmidt.

H. arizonensis n. sp.—Oblong oval, dark castaneous, moderately shining. Antennæ rufo-testaceous, club piceous. Head sparsely punctate; labrum deeply bilobed. Thorax more than twice as wide as long, base and apex truncate, hind angles obtuse, surface finely and sparsely punctate. Elytra as wide at base as the thorax, oval, gradually narrowing to apex, finely striate, striæ punctured, the intervals not punctulate but transversely strigose, the 3-5-7 with distant punctures. Metasternum coarsely punctured at the sides. Abdomen more finely and sparsely punctate. Legs testaceous. Length .10 inch; 2.5 mm.

One female specimen, with simple femora, belongs to the series indicated by me with bilobed labrum and differs from all the species of that series by the distantly strigose elytral intervals.

One specimen, Arizona.

SCYDMÆNIDÆ.

SCYDMÆNUS Latr.

S. deformatus n. sp.—Reddish brown, shining, very sparsely pubescent. Head oval, gradually narrowed behind the eyes, then suddenly constricted to a neck, by which it is slightly separated from the thorax. Thorax conical, truncate at apex and base, as long as wide at base, apex about one-fourth narrower, surface smooth, shining. Elytra wider at base than the thorax, ovate, very little longer than wide, widest at middle, then rapidly narrower to apex, base slightly depressed, humeral umbone slightly prominent, surface shining, very sparsely and minutely punctulate. Legs moderately long, femora not strongly clavate. Length .08 inch; 2 mm.

Male—Antennæ with first joint cylindrical, slightly narrower toward the base, second and third conical, similar, together longer than the first, fourth shorter and slightly broader, fifth transversely oval, very broad, prolonged on the upper side, sixth and seventh also transverse, narrower than the fifth, the seventh being a little narrower than the sixth, eighth smaller than the seventh, rounded, ninth broader and as long as the two preceding joints together, tenth conical, a little wider than the ninth and one-third longer, eleventh oval, a little longer than the tenth (Pl. 5, fig. 11).

This species may be referred to Schaum's stirps 4 (Germar Zeitschr. v, p. 465), by the distinct neck, the carinate mesosternum, the long second joint of max. palpi, and the subulate terminal joint.

The specimens before me would have been referred to *S. biformis* Mækl. (Bull. Mosc. 1852, ii, p. 330) but the author says that species has a four-jointed club, and that the sides of the thorax are impressed in front of base.

Several specimens were collected by Mr. Crotch at Los Angeles, Cala.

Digitized by Google

EROTYLIDÆ.

LANGURIA Latr.

L. divisa n. sp.—Slender, black with slight tinge of bronze, anterior half of thorax red. Head black above and beneath with slight bronze tinge, coarsely sparsely punctate. Thorax about one-fourth longer than wide, apex and base equal, sides very nearly straight, sparsely punctate, anterior half red, posterior black, the line of division being very sinuous. Elytra with rows of moderate size, rather deeply impressed, closely placed punctures which become gradually finer posteriorly and reach nearly the tip, intervals flat with a row of distant fine punctures. Thorax beneath red, except at the posterior angles. Body beneath black, very sparsely finely punctate, last ventral segment more coarsely punctate. Legs black, smooth. Length .40 inch; 10 mm. (Pl. 5, fig. 25a.)

A species which might readily be supposed to be a variety of *gracilis*, but the arrangement of color seems very constant. *L. gracilis* seems always to have the head and thorax beneath entirely red, and while the dorsal black vitta may expand to that the entire disc above is black, there is never a tendency to divide the color transversely.

Three specimens, Colorado and New Mexico.

LANGURITES Motsch.

L. lineatus Cast.—Body beneath entirely red. Antennæ piceous, basal joint red, club very gradually formed, four-jointed. Head entirely red (a small occipital piceous spot), above and beneath very sparsely finely punctate, supra-orbital line rather distant from the eye. Thorax about one-fifth longer than wide, base slightly broader than apex, sides nearly straight, surface smooth, impunctate, color above red with a median entire vitta and very narrow side margin black; beneath red, a little more widely black at the sides than above. Scutellum piceous. Elytra piceous with a basal spot on each side red extending about one-fifth of the elytra but not well defined, disc with rows of feebly impressed punctures which become obsolete near the tip; sutural angle of elytra emarginate but not spinous. Body beneath smooth, last ventral segment coarsely closely punctate at tip. Legs red, tarsi and posterior tibiæ piceous; upper side of anterior and middle femora striped with black. Length .40 inch; 10 mm.

This species differs from all in our fauna in the very oblique emargination of the sutural angle of the elytra (Pl. 5, fig. 25b) and the antennal club of but four joints.

One specimen, Arizona, occurs from Venezuela northward.

COLYDIIDÆ.

SYNCHITA Hellw.

S. dentata n. sp.—Piceous, opaque, moderately elongate. Head rather coarsely granulate. Thorax nearly square, very slightly narrower behind, apex truncate, base arcuate, margin rather coarsely 8-dentate and fimbriate, disc convex with coarse tubercles. Elytra scarcely wider at base than the thorax, slightly wider posteriorly, lateral margin serrulate, disc with rows of rather coarse granules replacing the costæ. Body beneath rugous. Length .10 inch; 2.5 mm.

Digitized by Google

Related to *granulata* but smaller, more convex, with relatively coarser tubercles and a more nearly square thorax much more coarsely dentate at the sides.

One specimen, Tampa, Fla.

S. obscura n. sp.—Piceous opaque, facies of diminutive *Cicones marginalis*. Head very coarsely granulated. Thorax nearly one-half wider than long, base slightly wider than apex, sides feebly arcuate, margin narrowly explanate, fimbriate with short stiff hairs which are directed anteriorly, hind angles obtuse. disc convex, roughly granulate. Elytra not wider than the thorax, a little more than twice as long, disc with suture and four costæ finely elevated and bearing short, semi-erect, curved setæ, the intervals coarsely, biseriately punctate, the interval between the margin and costa with one series of punctures, these closely placed. Body beneath opaque, scabrous. Length .05 inch; 1.25 mm.

The smallest species known to me. It is related by its costate elytra to *laticollis* and *variegata*, and agrees with the latter in the absence of an elevated line on the thorax, but differs in its much shorter and broader form and the absence of color ornamentation on the elytra. My specimen has a trace of a paler spot near the base of the first costa.

One specimen, District of Columbia. E. A. Schwarz.

DITOMA Illig.

D. quadricollis n. sp.—Dark brown, opaque, form depressed, parallel. Antennæ ferruginous, ninth joint scarcely wider than the eighth. Head rather coarsely granulate, epistoma pale. Thorax wider than long, sides straight, the margin serrulate, base and apex equal, disc with two costæ each side the outer joining the apical and basal margins, the inner starting at the base curved at tip near the apex; two short prescutellar costæ which converge in front. Elytra very little wider than the thorax, suture, margin and four discal costæ moderately elevated, the intervals coarsely biseriately granular. Body beneath paler, opaque, more finely granulate and sparsely pubescent. Legs ferruginous. Length .10 inch; 2.5 mm.

This species is closely related to *quadriguttata* and *ornata*, which are maculate on the elytra. Independently of color the former species is broader, the sides of the thorax are distinctly arcuate and scarcely perceptibly crenulate; the latter species has the thorax distinctly narrower behind. In the present species the base of the thorax is less arcuate, so that the hind angles are closer to the elytral humeri.

Collected by Morrison in North Carolina.

LASCONOTUS Erichs.

L. vegrandis n. sp.—Form slender, dark brown opaque, elytra somewhat paler at base. Antennæ rufous. Head coarsely moderately closely punctate. Thorax longer than wide, sides nearly parallel and straight, anterior angles rather obtuse, posterior angles sharply rectangular, middle of disc broadly but vaguely

Digitized by Google

concave, on each side of this an almost obsolete impressed line, surface densely punctate. Elytra wider than the thorax, parallel, four discal costæ, suture and margin moderately elevated, intervals biseriately coarsely and closely punctate, the two rows narrowly separated. Body beneath darker than above, closely coarsely punctate. Length .12 inch; 3 mm.

This species has no striking peculiarities. By its characters it is related to *simplex* Lec., but is larger, the punctures of the intervals smaller, without thickened anterior margin of thorax, and with well defined hind angles of the thorax.

One specimen collected by J. J. Rivers, near Berkeley, Cala.

L. servus n. sp.—Moderately elongate, brown, opaque. Head moderately coarsely punctate. Thorax a little longer than wide, sides nearly straight, anterior angles obtuse, the posterior distinct, disc broadly longitudinally concave at middle, between this and the side margin an elevated line which joins both the apical and basal margins, hooked at each end and entering for a short distance the apical and basal ends of the median concavity, apical margin thickened, surface moderately closely coarsely punctate. Elytra very little wider than the thorax, four discal costæ, suture and margin slightly elevated, intervals biseriately punctate, the punctures distinctly separated, and the rows of punctures as widely separated as the diameter of the punctures. Body beneath opaque, the prothorax coarsely punctate, the abdomen granulate. Length .12 inch; 3 mm. nearly.

Related to the preceding species and *simplex*, and differs from both by the presence of an elevated line between the median concavity of the thorax and the side. The thoracic sculpture seems to be a more complete development of that seen in *referendarius*.

The species of Lasconotus now known to me are separable in the following manner:

Elytra equally costate over the whole surface.
  Thorax costate, or with feebly elevated sinuous lines.
    Thorax wider than long.
      Disc of thorax costate. Eyes partially concealed.....**complex** Lec.
      Disc with sinuous lines indicated by pubescence.....**borealis** Horn
    Thorax longer than wide, disc with sinuous lines.....**linearis** Crotch.
  Thorax vaguely longitudinally concave.
    Thorax longer than wide.
      Disc without elevated line between the middle and side.
        Apical margin not thickened, hind angles sharply rectangular.
vegrandis Horn.
        Apical margin thickened, hind angles obtuse.....**simplex** Lec.
      Disc with lateral elevated line.....**servus** Horn.
    Thorax as wide as long, no lateral elevated line, apical margin thickened.
referendarius Zimm.
Elytra broadly longitudinally concave, the fifth interval rather strongly elevated, the first and third not.....**pusillus** Lec.

Digitized by Google

L. complex Lec., occurs in California and Nevada.
L. borealis Horn, at Lake Superior and White Mountains.
L. linearis Crotch, California.
L. vegrandis Horn, California.
L. simplex Lec., Cape San Lucas.
L. servus Horn, California.
L. referendarius Zimm., District of Columbia to Florida. .
L. pusillus Lec., Florida to Arizona, Vancouver and Nevada.

COXELUS Latr.

C. serratus n. sp.—Oblong oval, brown or piceous, opaque. Head granular, with sparsely placed scale-like hairs. Antennæ with joints 2–8 short, the outer ones moniliform, the third not longer than fourth. Thorax transverse, slightly narrower behind, disc convex, a vague median groove, margin narrowly serrate and fimbriate, surface granular and punctate. Elytra oval, not wider than the thorax and about two and a half times as long, with rows of very large and deep, closely placed punctures, the intervals very narrow, surface sparsely clothed with short cinereous pubescence. Body beneath granulate, opaque. Length .08–.10 inch; 2–2.5 mm.

A very small species compared with our others, and with disproportionately deep elytral sculpture. When the surface is coated with the usual exudation it seems roughly granulate. Easily known by its small size and serrate thorax.

Two specimens from California, from Mr. H. Ulke.

HISTERIDÆ.

ULKEUS n. g.

Head deeply inserted, front deeply concave with two feeble carinæ convergent above, epistoma truncate. Labrum small, trapezoidal. Mandibles stout, not prominent. Eyes convex, very coarsely granulate.

Antennæ inserted under a frontal margin, 10-jointed, first joint cylindrical, gradually broader externally, second joint large, thick irregularly pentagonal in outline, third joint shorter than the first, as long as the next three, elongate conical, arcuate, arising from the posterior angle of the second, joints 4–9 short, transverse, gradually wider, joint 10 oval, not compressed, as long as four or five preceding joints together, surface entirely pubescent, but partly corneous on the upper side.

Thorax transverse, antennal fossa large and deep, situated at the anterior angle of the thorax between the dorsal and pectoral plates, widely open in front. Prosternum moderately wide, a short lobe in front, bistriate, posteriorly flattened and slightly excavated at middle.

Mesosternum truncate in front, with a submarginal line very sinuous at middle.

Pygidium oval, inflexed.

Legs moderate in length, anterior femora much stouter than the others, the tibiæ all dilated, without spurs, the anterior truncate at tip, the outer edge minutely denticulate at lower half, middle and posterior tibiæ slightly fimbriate externally. Tarsi 5-jointed, received in badly defined oblique grooves on the upper side of the tibiæ; claws two, slender and feebly arcuate.

Digitized by Google

This genus of Histeridæ must be associated with Hetærius and its allies, Echinodes and Eretmotes, from which it differs in having the club oval, and in great part spongy pubescent over its entire surface except for a space on the upper side. In this respect it is more closely related to Scapicœlis, which is not placed in close relationship with Hetærius by Marseul. The essential differences between the present genus and Scapicœlis are in the form of the prosternum—emarginate at tip and each side bistriate in Scapicœlis, the mesosternum sinuate in front, the anterior tibiæ broadly emarginate externally and not denticulate. The eyes in Ulkeus are more coarsely granulate than in any Histeride I have examined.

In the preceding description the antennæ are given as 10-jointed, while all the figures of Hetærius and Scapicœlis give but nine joints. In a careful examination of the antennæ of the present genus made necessary by the sketch given, it was found that the large joint which is usually called the first really consists of two, the suture being well marked. This led me to an examination of Hetærius, and on removing an antenna of *H. Blanchardi* the same structure became evident.

In our genus Tribalister the club is solid, the entire surface pubescent and the entire antennæ is constructed after the usual mode in Histeridæ, with the scape long. A more careful examination of the antennæ of those genera in which the apparent first joint is very large and thick would probably show the structure indicated for Ulkeus and figured on the accompanying plate.

U. intricatus n. sp.—Oval, convex, castaneous shining. Head smooth, vertex with two elevated lines convergent above. Thorax a little more than twice as wide as long, margin acute, outline somewhat sinuous, surface shining, a deep arcuate groove limited externally by an elevated ridge beginning opposite the base of the first dorsal stria extending forward and joining that from the opposite side, a finely elevated line starts from opposite the base of dorsal striæ 2–3–4 arching forward and joining a net-work at the middle, the line opposite the second dorsal very sinuous; a few large punctures bearing short erect setæ placed near the lateral margin, many placed along the sinuous line, a few near the two inner lines. Scutellum small but distinct. Elytra with five entire striæ, the sutural interval with a row of coarse setigerous punctures, striæ 1–4 deep, with coarse, rather closely placed punctures each bearing one, often two erect setæ, a very short marginal stria extending one-third from the base bearing punctures and setæ; intervals smooth and shining. Pygidium and propygidium with sparsely placed setigerous punctures. Body beneath smooth shining, a few fine punctures on the metasternum with a few others coarser and setigerous placed near a line of sculpture at middle, and others along the posterior border. Abdomen smooth, first segment with a row of setigerous punctures close to the metasternum. Legs smooth, a fine marginal line on the middle and posterior tibiæ beneath. Length .06 inch; 1.5 mm. (Pl. 4, fig. 9–10.)

Digitized by Google

A better idea may be obtained from the accompanying drawings of the intricacies of the thoracic sculpture than from a lengthy description, for such details the student is referred to the plate.

In naming the genus I desire to pay a tribute of regard to a sincere friend, an untiring collector and enthusiastic entomologist, whose kind assistance I have so often had occasion to acknowledge in this and previous essays, Mr. Henry Ulke, of Washington.

The specimen described is one of two, from the collection of Mr. Ulke, and was collected in Kansas, the other is from Texas.

BUPRESTIDÆ.

HALECIA L. et G.

H. gentilis n. sp.—Form moderately robust as in *Psiloptera Drummondi* but more narrowed posteriorly, surface bright metallic green, smoother beneath than above. Head coarsely and deeply punctured, the front slightly concave. Thorax a little longer than the width at apex, base nearly one-half broader, sides regularly arcuate and gradually narrowing from the base to apex, hind angles acute, not prolonged, disc moderately convex, median line broadly impressed posteriorly, surface coarsely, deeply and moderately closely punctured, the punctures at sides coarser and deeper than those of the disc. Elytra as wide at base as the thorax and about two and a half times as long, sides gradually narrowing from the base, the lateral margin serrulate at apical third, sutural angle acute, disc very vaguely sulcate without trace of striæ, the surface coarsely and deeply punctured, the punctures rather finer and denser near the apex. Prothorax beneath coarsely and deeply punctate, metasternum more finely punctate, very sparsely at middle, more closely at the sides. Abdomen more finely and densely punctured, especially at the sides and apex. Length .40–.56 inch; 10–14 mm.

It is with considerable doubt that this species is referred to Halecia. That it belongs to the Chalcophorides as defined by authors generally, is very plainly evident, but the genera of the group and even the divisions of the group itself seem very vaguely characterized. A specimen of the above species sent to Mr. Sallé elicted the opinion that it was either a Pelecopselaphus or a new genus. I am unwilling to place it in that genus as the tarsi are flattened from the second joint, and the first joint very distinctly longer than the second. In these respects it agrees more nearly with Hippomelas, in which I include three of our species formerly placed in Gyascutus. In the genera Gyascutus, Hippomelas and Psiloptera, the antennæ are inserted in a fovea, which is partly covered by an oblique plate; in Chalcophora there is a slight ridge, while in the species now under consideration the antennal foveæ are entirely uncovered without trace of the ridge. As I feel certain that the insect cannot be placed in any of the genera cited it is placed provisionally in Halecia. As speci-

Digitized by Google

mens collected by Dr. Palmer in Coahuila have been sent to the editors of the Biologia Centrali-Americana the species will doubtless receive attention from Mr. Waterhouse.

Southwestern Texas and Coahuila, Mexico.

Regarding Halecia Mr. Waterhouse remarks (Biol. Cent. Am. vol. iii, pt. 1, p. 5): "This genus, as at present constituted, is found throughout America from Pennsylvania to Patagonia." am not aware of any species from the Atlantic region which can be referred to Halecia.

CHRYSOBOTHRIS Esch.

C. ignicollis n. sp.—Dark bronze, head and thorax bright coppery red. Clypeus broadly but not deeply emarginate. Front densely coarsely punctured, nearly flat ♂, more convex ♀, the latter with distinct smoother spaces; occiput with smooth median line. Thorax twice as wide as long, sides strongly arcuate in front, feebly at middle, obliquely convergent behind, surface coarsely but not closely punctured at middle, very densely and coarsely at the sides, base deeply bisinuate. Elytra little wider than the thorax, sides nearly parallel, apical third obliquely narrowed, apices separately rounded, lateral margin posteriorly serrulate, subsutural costa extending from apex to middle, a deep depression at middle of base, the surface rather densely and coarsely punctured with an elevated indistinct space at basal third, a larger quadrate space slightly behind the middle, another one-fourth before the apex. Body beneath coarsely not closely punctured, last ventral segment serrulate at the sides. Length .28–.30 inch; 7–7.5 mm.

Male.—Anterior femora toothed, the tooth serrate outwardly; anterior tibiæ slightly arcuate and with an acute tooth one-third from apex; middle tibiæ slightly arcuate and sinuous on the inner side; posterior tibiæ straight. Last ventral rather deeply semi-circularly emarginate.

Female.—Anterior femora as in ♂, anterior tibiæ slender slightly arcuate, without tooth; middle and posterior tibiæ straight, not sinuous on the inner side. Last ventral very feebly emarginate.

A small species resembling *contigua* in sculpture. It belongs to a small group in which the male anterior tibiæ are toothed near the tip, all of which differ in the form of the clypeal emargination.

This species is moreover noteworthy in having the middle ♂ tibiæ sinuate within.

Occurs in Colorado and Texas.

SCHIZOPUS Lec.

S. Sallei n. sp.—Oblong oval, moderately robust. Head coarsely and very densely punctured. Thorax transverse more than twice as wide as long, broadest at base, sides gradually sinuately narrowing to the front, coarsely, deeply and densely punctured, a very deep oblique impression on each side. Elytra a little wider than the thorax, sides nearly parallel in front, apical half gradually converging, apices separately rounded, surface coarsely punctate scabrous, color

Digitized by Google

brownish yellow with a darker vitta extending from the umbone nearly to the tip. Body beneath more sparsely punctate than above, more shining and distinctly æneous. Femora brown, tibiæ and tarsi paler. Length .52 inch; 13 mm. (Pl. 4, fig. 14.)

The head and thorax are darker in color than the elytra, the apex of the thorax being, however, somewhat paler. The body beneath is brownish testaceous with a slight æneous lustre.

Closely related to *S. laetus*, but differing notably in color, somewhat in sculpture, and with much deeper oblique impressions on the thorax.

One specimen kindly given me by my friend Sallé, collected by M. Alphonse Thevenet at Mariposa, Cala.

DYSTAXIA Lec.

D. LeContei Thomson.—Typi Buprestidarum, Paris, 1879, p. 6.—Crassa, obesa, convexa. Caput sat profunde et valde confertim punctulatum. Prothorax subtrapezoidalis, antice angustior et postice latior, profunde et confertim punctatus. Scutellum subrotundatum. Elytra tenuissime et confertissime granuloso-punctata, obsolete longitudin. 6-costata, apice subacuta. Corpus subtus tenuiter punctatum, Pedes punctis aliquibus impressi.

Supra bruneo-rufo aureo-viridi repercussa; antennæ desunt; corpus subtus viridi-aureum, albo-villosum, pedes clare castanei, nitidi. Long 12.5 mm.

The above is the description by Thomson of a form which seems from a specimen in my cabinet to apply rather to an immature and somewhat distorted specimen than to a valid species.

THRINCOPYGE Lec.

T. laetifica n. sp.—Form elongate, subdepressed, entirely brilliant metallic green, shining. Front moderately convex, coarsely, deeply and closely punctate. Thorax about one-third wider than long, slightly wider at base, sides regularly arcuate, widest at middle and with a submarginal impressed line at basal two thirds, apex truncate, base bisinuate, hind angles distinct but rather obtuse: disc moderately convex, median line slightly impressed posteriorly, surface with coarse punctures, sparsely and irregularly placed, coarser near the sides and closer near the front angles. Elytra as wide as the thorax at base, sides parallel, gradually narrowed at apical third, the margin slightly serrate near the apex, the tip truncate and serrulate; surface striate, striæ coarsely not closely punctate, intervals flat with a single series of fine punctures. Prosternum coarsely punctured, the flanks very coarsely but not closely. Metasternum sparsely at middle, densely at the sides. Abdomen coarsely punctured, the third and fourth segments more finely and closely, the fifth more densely. Length .64 inch; 16 mm.

A smaller species than our other two and more convex and differently colored.

Kindly given me by Mr. A. S. Fuller, who obtained it from Texas.

Our species of Thrincopyge may be distinguished in the following manner:

Digitized by Google

Side margin of thorax bordered with yellow.
Elytra with three yellow spots on each variable in size or nearly absent, the lateral margin never entirely yellow.....**alacris** Lec.
Elytra not maculate, the entire lateral margin narrowly yellow.
ambiens Lec.
Side margin of thorax not yellow.
Elytra entirely metallic green.....**laetifica** Horn.

These species are known to occur as follows:

alacris Lec., Texas, Arizona and Mexico.
ambiens Lec., Texas, Arizona.
laetifica Horn, Texas.

TYNDARIS Thoms.

T. cincta n. sp.—Form robust, depressed cylindrical, narrower posteriorly, black, æneous beneath, elytra with a pale median fascia not reaching the suture. Head convex, surface shining, slightly æneous, coarsely and moderately closely punctured. Antennæ black, slender (first six joints only). Thorax a little wider than long, narrower in front, sides moderately arcuate, broadest at middle, base slightly narrower, hind angles rectangular, disc convex, opaque, moderately densely punctate, a smoother median line extending from base nearly to apex. Elytra black, more shining than the thorax, not wider at base than it, gradually narrower posteriorly, lateral margin finely serrulate posteriorly, the apices separately rounded and quadridentate, disc moderately convex, striate, striæ punctured, intervals flat coarsely and irregularly but not closely punctate, the apical portions of the outer intervals distinctly muricate. Flanks of prothorax moderately densely punctate with silvery white pubescence, extreme side margin smooth, prosternum more finely punctured in front, coarsely and densely punctured at tip. Metasternum and coxal plates more coarsely punctured at middle, more densely and finely at the sides and with silvery white pubescence. Abdomen with the first segment and the middle of the other segments less densely punctured than at the sides where there is silvery pubescence. Legs black with slight violaceous lustre. Length .44 inch; 11 mm. (Pl. 4, fig. 13.)

This insect is of the same general form as *Ptosima gibbicollis*, but with a more robust facies. The median elytral band is very much broader at the side margin and the posterior edge is oblique, the anterior concave. The color of the band is pale red at the side and yellowish white on the disc.

The genus to which I have referred this insect is represented by two species from Chili, but the description by Thomson (Archives i, p. 168) and Lacordaire's note (Genera iv, p. 66, note) apply so closely to our insect that I see no reason for separating it. In our series it is most closely related to *Ptosima*, from which it differs particularly in its simple tarsal claws.

One specimen Texas, given me by Mr. A. S. Fuller.

Digitized by Google

LAMPYRIDÆ.

ZARHIPIS Lec.

In addition to the characters given by Dr. LeConte (Trans. Am. Ent. Soc. ix, p. 39) for the differentiation of the species there are some differences in the form of the maxillary palpi which seem important.

Z. integripennis Lec.—First joint of maxillary palpi longer than either of the others, but not as long as tne two following together Last joint very little longer than the preceding and slightly broader at tip. Palpi entirely yellow.

Z. ruficollis Lec.—Palpi as in *integripennis*, the last joint piceous.

Z. piciventris Lec.—Palpi entirely piceous. the last joint wider at tip and obliquely truncate.

Z. Riversi n. sp.—Head piceous, middle of front and the clypeus reddish yellow. Antennæ piceous, about one-third the length of the body, basal joint pale. Palpi testaceous, last joint piceous, triangular, obliquely truncate and shorter than the preceding joint. Thorax transverse, reddish yellow, finely sparsely punctulate, margin broad, equal at apex and base. Scutellum yellow. Elytra black, scabrous, vaguely obliquely bi-costate. Abdomen moderately densely punctate, pale reddish yellow, last segment piceous. Body beneath entirely pale reddish yellow except the last ventral segment. Length .56 inch; 14 mm.

One specimen ♂ sent me by Mr. J. J. Rivers, from Berkeley, Cala.

The superficial characters separating these species seem very constant, and may be tabulated as follows:

Head entirely yellow.
  Body beneath, abdomen and legs yellow.....**integripennis.**
Head in great part piceous.
  Beneath entirely yellow except the last ventral segment.....**Riversi.**
  Metasternum and last ventral segment piceous, abdomen otherwise yellow.
ruficollis.
  Metasternum and entire abdomen piceous, nearly black.....**piciventris.**

In Phengodes there are no marked palpar differences except that in *fusciceps* and *Sallei* these organs are shorter as Dr. LeConte observed to be the case with the antennæ.

LYCUS Fab.

L. Fernandezi Dugès, La Naturaleza, iv, p. 175, Pl. 6, figs. 5, 6; Gorham, Biol. Cent. Am. iii, pt. 2, p. 2.

This species occurs in Texas and Arizona. Its style of coloration is very similar to *cruentus*, but the black tip of the elytra is relatively smaller, and is distinctly notched where the humeral costa enters it. In form the present species is very much more expanded behind the humeri, and is of larger size.

Digitized by Google

LYCOSTOMUS Motsch.

L. loripes Chev. (*Lycus*) Col. Mex. Cent. ii, 148; Gorham, loc. cit. p. 6, Pl. 1, fig. 8.

Entirely reddish yellow, tibiæ and tarsi (except the claws) antennæ (except the basal joints) black.

These few words will distinguish this species from any described in our fauna. Specimens probably exist in cabinets with the recent manuscript name *pedalis* Lec. The females have all the tibiæ black, in the males the front tibiæ are in part or entirely yellow.

Occurs in Arizona.

L. sanguineus Gorham, Biol. Cent. Am. vol. iii, pt. 2, p. 226.—Pale blood-red. antennæ, tarsi and apical fourth of elytra black. Length 12–14 mm. ♂; 18–20 mm. ♀.

In the female of this species the abdomen is more dilated than the male and extends three-fourths the length of the elytra beyond their apices.

I found this species labeled *L. posticus* in Dr. LeConte's cabinet. It has never been described by him.

This species was collected by Morrison and sold to us as from Arizona, and sent to Gorham as from Sonora.

LYGISTOPTERUS Muls.

L. laetus Gorham, loc. cit. p. 227, Pl. xi, fig. 2.—Beneath blue-black; antennæ, disc of thorax at middle and tip of elytra narrowly, blue-black; elytra and sides of thorax orange-red. Length 7–11 mm.

This species is the one labeled by me as a Calochromus. The work on this family has at all times been done by Dr. LeConte, and my notes on his cabinet show that this species bears the manuscript name *Lygist. ignitus*.

Arizona, Morrison.

LYCAINA Dugès.

L. marginata Gorham, loc. cit. p. 209, Pl. xii, fig. 8.—Piceous, sides of thorax, lateral margin of elytra, anterior and middle femora orange-yellow. Length 6–7 mm.

The disc of the elytra has sometimes a bluish tinge. This insect figures in Dr. LeConte's cabinet among the Lygistopteri under the name of *L. debilis*. Having given but little attention to this family any expression as to the validity of the genus proposed by Dugès and accepted by Gorham, would have but little value.

Collected in Arizona by Morrison.

Digitized by Google

L. discoidalis n. sp.—Beneath piceous; antennæ black, under side of basal joint yellow; thorax piceous at middle, broadly yellow at the sides, median impression deep but narrow, surface rather shining, sparsely finely punctate and rather sparsely pubescent; elytra orange-yellow, with a common blue-black oval space beginning at the apex and reaching nearly the middle, surface not striate but with three faintly elevated costæ, intervals rather coarsely punctate, surface fulvo-pubescent; anterior and middle femora orange-yellow. Length 7–7.5 mm.

This species differs in the sculpture of the elytra from both the described species as well as in their color.

Three specimens, southwestern Texas.

In the work above, cited p. 237, Mr. Gorham is disposed to refer *Eros humeralis* and *trilineatus* to Plateros. For reasons above given I prefer publishing the opinion without comment.

CHAULIOGNATHUS Hentz.

C. ineptus n. sp.—Reddish yellow, head, tibiæ, tarsi, outer half of femora and apical third of elytra black. Antennæ long, slender, flattened, yellowish, basal joint piceous, third joint a little shorter than the fourth, outer joints slightly fuscous. Head oval, black, opaque, moderately densely punctured, eyes moderately prominent. Thorax much wider than the head, broader than long, sides regularly arcuate and reflexed, surface moderately closely punctate sparsely pubescent, disc usually with three black spots which are sometimes absent or confluent. Elytra scarcely wider than the thorax, parallel, the apices obliquely rounded, moderately closely punctate, sparsely pubescent, apical third black, each black space arcuate in front. Scutellum reddish yellow. Body beneath yellow, the terminal segment of ♂ black. Length .60–.64 inch; 15–16 mm.

This species is most closely related to *profundus* in form, but the two differ in coloration, the latter being scarlet, including the head, antennæ uniformly brown and legs entirely black.

Occurs in Arizona (Morrison).

C. misellus n. sp.—Form slender, pale yellow, head and legs black. Head oval, black, subopaque, finely punctulate, sparsely pubescent, genæ and mandibles yellow. Antennæ slender, piceous, nearly as long as the entire body in the male, third joint very little shorter than the fourth. Thorax wider than the head, as long or a little longer than wide ♂, broader than long ♀, sides feebly arcuate, rather broadly reflexed, disc nearly entirely smooth and shining. Elytra wider than the thorax, covering entirely the abdomen in both sexes, parallel, apices separately rounded, surface opaque, sparsely pubescent, moderately closely and deeply, not coarsely punctured, the sculpture more rugose toward the apex, color sometimes entirely pale yellow, often with a small piceous spot on each elytron one-third from apex. Body beneath pale yellow ♂, with the coxæ and posterior portion of metasternum brown; in the ♀ the basal portion of each ventral segment is brown. Legs black. Length .42 .50 inch; 10.5–12.5 mm.

This species resembles *discus* Lec., and differs especially in the black head, and the absence of discal thoracic spots. In *discus* both sexes are pale beneath.

Occurs in Arizona.

Digitized by Google

CLERIDÆ.

TILLUS Oliv.

T. occidentalis Gorham, Biol. Cent. Am. iii, pt. 2, p. 129, Pl. ix, fig. 1.

This species occurs in Texas and Arizona. It is rather small (3–5 mm.) slender in form, color usually piceous, the elytra with a small oval ivory-like spot at base and an oblique band of similar color at middle. The color varies, being in most cases entirely piceous except the spots and band, but specimens are before me entirely reddish yellow with only the portion of the elytra behind the band piceous. Rarely the basal ivory spot is indistinct.

Unaware of the above name the species has been labeled *laetus* in Dr. LeConte's cabinet.

COLYPHUS Spin.

C. signaticollis Spin. Clerites i, p. 135.

C. cinctipennis Spin. id. p. 136.

These two species are said by Spinola to have been collected in California. By reference to the above cited descriptions, the specimens were obtained from the Dupont collection. I have already on several occasions indicated the erroneousness of the localities given by Dupont, and now these two seem to be rather abundant in the eastern regions of Mexico.

I am quite sure that all the Dupont specimens attributed to California are from southwestern Texas and the adjacent regions of Mexico.

The two species above cited should be stricken from our lists.

Two other species are mentioned by Spinola: *C. rufipennis* (p. 136) and *C. interceptus* (p. 137) as from California. These also are Dupont specimens, but no mention is made of them in the Biologia, and, as with the preceding two species, the locality is probably doubtful.

CYMATODERA Gray.

C. turbata n. sp.—Rufo-testaceous, elytra piceous with a broad fascia slightly ante-median and apical fourth rufo-testaceous. Antennæ slender, a little longer than the head, joints 2–3–4 short, conical, equal, joints 5–10 longer than these, joint 11 one-half longer than the tenth. Head rather coarsely not closely punctate. Thorax cylindrical, nearly twice as long as wide at apex, slightly narrower at base than apex, behind the middle on each side compressed, surface sparsely punctate, sparsely clothed with erect yellowish hairs, ante-scutellar impression feeble. Elytra wider than the thorax, parallel, apices conjointly rounded, disc with rows of coarse, closely placed punctures which are gradually finer to the tip, intervals narrower than the rows of punctures, surface sparsely clothed with semi-recumbent and with erect yellowish hair. Body beneath sparsely punctate. Legs somewhat roughly punctured. Length .16–.26 inch; 4–6.5 mm.

Digitized by Google

I am unable to detect any sexual differences in the specimens before me, the last abdominal segments of the dorsal and ventral aspect being oval at tip.

There is considerable variation in the color of the elytra, although the type of coloration is preserved. In those fully colored about one-fourth at base is piceous, then a broad pale band, following the latter another broad piceous band, the tip for about one-fourth is pale. The tendency is to become paler. The basal piceous band is gradually lost, then the post-median piceous band becomes narrower so that the elytra are finally rufo-testaceous with a very narrow piceous band behind the middle.

This species belongs in our series near *puncticollis*, and differs in its longer thorax, less coarsely punctured elytra and different coloration.

Occurs in southwestern Texas.

C. texana Gorham, Biol. Cent. Am. iii, pt. 2, p. 134.

This is the species referred to by me but not named (Trans. Am. Ent. Soc. v, p. 230). It is closely allied to *fuscula* Lec., and differs in the presence of the sub-apical pale spot. The variety referred to by Mr. Gorham as having no apical spot is without doubt the true *fuscula* Lec. If the two forms are really identical the latter name should prevail.

C. sirpata n. sp.—Form slender, piceous, legs and antennæ brown, elytra testaceous with piceous fasciæ. Antennæ slender, brown, joint 2 not longer than half the third, joints 3–10 subequal, 11 longer. Head coarsely, deeply and moderately closely punctate, sparsely pubescent. Thorax cylindrical, nearly twice as long as wide at apex, slightly contracted behind the apex and more decidedly compressed on each side behind the middle, surface coarsely, moderately closely punctate, sparsely pubescent, ante-scutellar impression feeble. Elytra wider than the thorax, humeri distinct, sides straight, very slightly divergent, apices conjointly rounded, disc with rows of coarse moderately closely placed punctures which become gradually finer toward the apex but do not reach the tip, intervals much wider than the punctures with a row of fine punctures, sparsely pubescent; color pale testaceous, humeral umbone piceous, a narrow piceous fascia one-third from base which extends along the suture to the scutellum and along the lateral margin to the base, a broad piceous fascia behind the middle with the anterior and posterior margins undulating, about one-fifth of the elytra at tip is testaceous. Body beneath piceous, abdomen sparsely punctate. Length .32–.38 inch; 8–9.5 mm.

Male.—Fourth ventral segment densely punctured at middle, fifth very feebly emarginate, sixth shorter truncate at tip and deeply longitudinally sulcate at middle; last dorsal narrower than the last ventral, oval at tip and entire.

Female.—Last ventral very short oval, last dorsal narrower oval at tip.

This is also one of the species merely indicated by me (Trans. Am. Ent. Soc. v, p. 230), but not fully described from the absence of the male. In its general appearance it resembles *undulata*, and might readily be considered a color variety, but the structure of the antennæ

Digitized by Google

and the male sexual characters prove its distinctness. By its antennal structure it should be associated with *xanti*, but that species is entirely brown and of much more robust form.

Occurs in southwestern Texas.

C. fallax n. sp.—Form elongate, rufo-testaceous, head, thorax and broad post-median elytral band piceous. Antennæ pale brown, joints 2–10 very nearly equal, eleventh longer. Head coarsely and densely punctured, subopaque, sparsely pubescent. Thorax subcylindrical, slightly narrower at base, twice as long as wide at apex, very slightly contracted behind the apex, a little more so in front of base, surface coarsely punctured, the punctures coarser than on the head but less dense, basal marginal groove distinct, ante-scutellar impression feeble, surface sparsely pubescent. Elytra elongate oval, gradually wider from the humeri which are not prominent, surface with rows of very coarse moderately closely placed punctures which become gradually finer posteriorly but do not quite reach the apex, intervals very narrow with a row of distant fine punctures, sparsely pubescent. Body beneath rufo-testaceous, moderately densely finely punctate. Legs yellowish testaceous. Wings abortive. Length .32–.46 inch; 8–11.5 mm.

Male.—Fifth ventral deeply semi-circularly emarginate, sixth ventral elongate, parallel, the sides arcuate at tip, the apex deeply quadrangularly emarginate; last dorsal narrower than the ventral, elongate oval, truncate at tip and with a slight notch at middle.

Female.—Last ventral short, semi-circular, smaller than the last dorsal which is more elongate oval and prolonged.

The elytra have a little variation in color. The post-median fascia is always present, and usually broad with irregular edges. Rarely there is a trace of a fascia at basal fourth and another in front of the apex. This species might be supposed to be a variety of *undulata*, but the elytra are much narrower at base, more oval, and but a small trace of wings remains. The sexual characters are of the type of *ovipennis* and *augustata*. From these last two species *fallax* differs in its more elongate elytra with stronger sculpture and with the head and thorax much more densely punctate.

Occurs in southwestern Texas.

From my memory merely, *fallax* resembles very closely Mr. Gorham's determination of *augustata*. That author after having placed *augustata*, *ovipennis* and *pilosella* in synonymy makes the following remarks: "The difficulty of determining the species of this genus is so great that I doubt the correctness of the synonymy given above, as adopted by American describers" (Biol. Cent. Am. iii, pt. 2, p. 138). That there is difficulty I admit, but it is to be regretted that some little attention was not given to many characters indicated by me (Trans. Am. Ent. Soc. v, p. 221), of which all mention is omitted in the Biologia. Regarding the synonymy,

Digitized by Google

no American describers are responsible for it, the only mention of such being in the 'Check List' by Mr. Crotch, for which no more authority exists than is claimed in the preface.

CLERUS Fab.

Our species of this genus are said by Mr. Gorham (Biol. iii, pt. 2, p. 148) "not to be typical and ought perhaps to be assigned to Thanasimus. This is true of a certain number (*trifasciatus*, *repandus*, *undulatus* and *dubius*), but not of the vast majority. In fact, Mr. Gorham includes *sphegeus*, *spinolae* and *nigripes* in Clerus as restricted by him.

Clerus mexicanus Lap. This species has for some time appeared in our lists. I have never seen a specimen from within our faunal limits and am unaware of any authority for its introduction.

C. arachnodes Klug. This species is placed as a synonym of *sphegeus* by Mr. Gorham (Biol. Cent. Am. iii, pt. 2, p. 150).

C. viduus Klug. This species is simply indicated from "Amerique Septentrionale," and as it is well known from Mexico and not at all in our fauna should be removed from our lists.

C. quadriguttatus Oliv. Of this species *nigrifrons* and *nigripes* Say, are synonyms.

C. thoracicus Oliv. This species is referred by Mr. Gorham to *Pœcilochroa* Chev., but the latter author says that this genus has 9-jointed antennæ, which is certainly not true of our species.

C. decussatus Klug, Abhand. Akad. Berl. p. 296; *Hopfneri* Spinola, Clerites 1, p. 256, Pl. xxv, fig. 1. Form of *ichneumoneus*, black, opaque, finely pubescent, elytra with an arcuate fascia at middle interrupted at the suture, behind this a common triangular spot, near the apex a narrower transverse fascia interrupted at suture, all of reddish yellow color. Length .38 inch; 9.5 mm.

The form described and figured by Spinola has the elytra in front of the median fascia, the thorax and head reddish. Specimens are noted by Mr. Gorham (Biol. Cent. Am. iii, pt. 2, p. 155) in which the anterior portion of the elytra is black. My specimen goes further in being entirely black. Similar variations in color seem quite common in Clerus, notably in our *C. abruptus* Lec.

One specimen, Arizona.

C. ocreatus n. sp.—Form of *rosmarus*, but slightly more robust, black, shining, sparsely hairy, antennæ, tibiæ and tarsi rufo-testaceous, elytra with a median band of cinereous pubescence broadly interrupted at the suture. Front rather flat, vaguely bi-impressed, head very sparsely punctate. Thorax slightly longer than wide, ovate, slightly tubulate at base, post-apical transverse impression distinct, median line not distinct, surface sparsely punctate, punctures coarser and more numerous along the apical margin. Elytra wider than the thorax, sides parallel to middle then slightly broader, apices conjointly rounded, surface shining, obsoletely punctate at basal half, more evidently punctured posteriorly; the

Digitized by Google

median band of cinereous pubescence begins at the lateral margin and extends to the middle line of the elytra, a few cinereous hairs about the apex. Body beneath shining, coarsely but sparsely punctured. Length .18 inch; 4.5 mm.

A small species which should be placed near *quadriguttatus* Ol. (*nigrifrons* Say), from which it differs by its more robust form, almost smooth surface and the color of the legs.

One specimen, Kansas.

PTINIDÆ.

SINOXYLON Dufts.

S. simplex n. sp.—Cylindrical, piceous, elytra brownish. Antennæ 10-jointed, pale yellow. Maxillary palpi with last two joints equal. Head opaque, tuberculate. Thorax wider than long, slightly arcuately narrower to the front, hind angles rounded, the anterior declivity roughly asperate, posteriorly densely punctate. Elytra not wider than the thorax, apex gradually declivous, not margined nor dentate, surface very coarsely and closely punctate, the punctures of the declivity being coarser and denser than those near the base of the elytra, sutural region slightly elevated, more conspicuously in the declivity. Body beneath moderately densely punctate, sparsely pubescent. Length .26 inch; 6.5 mm.

This species belongs to the first division of the genus as defined by me (Proc. Am. Philos. Soc. 1878, p. 542) from all the members of which it differs in the simple elytral declivity, excepting *dinoderoides*, which is much smaller and has the maxillary palpi otherwise formed.

Occurs in southwestern Texas.

The species referred by us to Sinoxylon including the one above described are said to belong to Xylopertha by Mr. Gorham (Biol. Cent. Am. iii, pt. 2, p. 215). I am not now prepared to investigate this question, and leave the species as they at present stand. Our species of Amphicerus are referred to Apate.

S. floridanum n. sp.—Cylindrical, piceous, moderately shining, elytra castaneous. Antennæ pale yellow, 10-jointed, the five joints of the female very small. Head closely punctate, subopaque. Thorax broader than long, slightly narrower in front, declivity in front roughly tuberculate and with the tubercles at the front angles slightly hooked, disc at middle closely punctate, posteriorly and at the hind angles quite smooth. Elytra a little narrower than the thorax, moderately coarsely but not closely punctate, declivity flat, on each side tri-tuberculate, the surface coarsely and evenly punctate. Body beneath sparsely punctate and pubescent. Length .12 inch; 3 mm.

This species is related to and should be associated with *texanum* and *sextuberculatum*. In the former the punctures of the declivity are few in number and arranged near the suture, leaving a smooth space near the tubercles. In the second species the declivity is quite smooth and the suture well elevated. In the present species the declivity is very flat and the coarse punctures very evenly disposed over its entire surface.

One specimen, Florida. Mr. F. G. Schaupp.

Digitized by Google

CHRYSOMELIDÆ.

CHRYSOCHUS Redt.

C. robustus n. sp.—Brilliant metallic blue with a slight tinge of green, form oval robust. Antennæ piceous, basal joint blue. Head sparsely punctate. Thorax about one-third wider at base than long, apex a little wider than the length, sides feebly arcuate, surface very sparsely punctate. Elytra wider than the thorax, widest at the humeri which are prominent, sides arcuately narrowing to apex, surface irregularly, moderately coarsely and sparsely punctured. Body beneath bright blue, as above, very sparsely punctate. Length .44 inch; 11 mm.

This species is much more robust than either *cobaltinus* or *auratus*. In these the elytra are parallel, in the present species they narrow from the base. The thorax in *robustus* is wider from the apex to the base, while in the other two species the sides are almost parallel posteriorly.

Arizona, collected by Morrison.

The three species may be correlated in the following manner:

Sides of thorax subparallel posteriorly, the punctuation of the surface conspicuous.
Surface color brilliant cupreous or golden; punctures of elytra arranged in confused rows.....**auratus.**
Surface color cobalt blue; punctures of elytra irregular.....**cobaltinus.**
Sides of thorax gradually wider from apex to base, the surface color blue with a slight tinge of green.....**robustus.**

Two other species have been described, *californicus* and *tenebricosus* (Marshall, Proc. Linn. Soc. Zool. 1864, p. 49), which are synonymous with *cobaltinus* Lec.

BRUCHIDÆ.

ZABROTES n. g.

Head strongly deflexed in repose the mouth resting between the middle coxæ. Mouth as in Bruchus. Eyes finely granulated, feebly emarginate in front. Antennæ slender, as long as the entire body, subserrate. Thorax acutely margined, base feebly lobed. Scutellum small. Elytra separately rounded at tip. Pygidium vertical entirely exposed. Anterior coxæ conical, prominent and contiguous, their cavities closed behind. Middle coxæ widely separated, the mesosternum nearly vertical in front. Posterior coxæ large, very narrowly separated at middle. Abdomen very short, not as long as the width of the coxæ, the first and last segments a little longer than the others, the intermediate segments linear. Tarsi as in Bruchus, the claws simple. Anterior and middle tibiæ without spurs, posterior tibiæ with two long movable spurs and finely spinulose on the inner side. Form robust, quadrate, body winged.

The most striking differences between this genus and Bruchus are found in the simple claws, movable hind tibial spurs, acutely margined thorax and widely separated middle coxæ. From Spermophagus as rep-

Digitized by Google

resented in our fauna by *robiniæ*, Zabrotes differs in the absolutely simple claws. It is probable that many of the small species at present referred to Spermophagus should belong to the present genus.

In addition to the characters given above the species at present known have the posterior femora deeply sinuate beneath, the condyles at the knee lamiform and without tooth. The tibiæ of the same legs are short, not longer than the first tarsal joint, the inner side with fine spinules.

The following species are now known to me:

Vertex very distinctly carinate.
A transverse band at middle of each elytra white.
Suture of elytra and pygidium in great part white, the latter with two transverse reniform black spots..... **cruciger.**
Suture concolorous.
Elytra separately rounded at tip, the band well defined..... **spectabilis.**
Elytra subtruncate at tip, the band indistinct..... **obliteratus.**
Pubescence above uniformly dark gray.
Punctures of thorax extremely fine and dense..... **densus.**
Vertex not or very indistinctly carinate.
Basal joint of antennæ red. Pubescence all gray..... **planifrons.**

All the above species are of short quadrate form, the elytra rather flat. In *cruciger* the sides of the elytra are more sinuate, so that the subhumeral lobe is very well marked.

Z. cruciger n. sp.—Form quadrate robust, depressed above, black. Head finely punctate, vertex carinate, sparsely pubescent. Antennæ black, as long as three-fourths the body, subserrate from the fifth joint. Thorax twice as wide at base as long, sides rapidly arcuately narrowing to the front, moderately convex, densely finely punctulate with numerous coarse punctures intermixed, pubescence sparse and gray, a denser whiter space in front of the scutellum on each side of which in front is a darker spot. Elytra not wider than the thorax, a little wider conjointly than long, apices separately rounded, sides lobed at basal half, surface striate, striæ closely punctured, intervals flat finely punctulate, densely clothed with black pubescence, the suture and a median slightly sinuous band white. Pygidium densely punctate, densely clothed with white pubescence, a transverse reniform spot on each side black. Body beneath black, clothed with gray pubescence. Coxal plates black, very coarsely punctured at outer half. Legs black, sparsely and finely pubescent. Length .10 inch; 2.5 mm.

This is the largest species, conspicuous in the style of its vestiture, and is with *obliteratus* remarkable in having the coxal plates coarsely punctate.

One specimen, Colorado.

Z. spectabilis n. sp.—General form and sculpture of the preceding species but much smaller. Thorax not densely clothed with brownish pubescence with a narrow whitish space at the sides and a small ante-scutellar spot. Elytra with separately rounded apices, clothed with brownish pubescence, a median, slightly oblique white fascia which does not reach the side or suture. Pygidium coarsely

Digitized by Google

punctured, pubescence brown with a narrow median white stripe. Body beneath sparsely clothed with gray pubescence. Coxal plates finely punctured. Length .06 inch; 1.5 mm.

Three specimens, Arizona and Nevada.

Z. obliteratus n. sp.—General form and sculpture of *cruciger*, but a little more oval. Antennæ slender, nearly as long as the entire body. Thorax moderately shining, rather densely finely punctured with numerous very coarse punctures near the sides, surface sparsely clothed with brownish pubescence. Elytra striate, striæ finely punctured, intervals flat finely punctulate, apices truncate, surface sparsely clothed with brownish pubescence with an indistinct short, median, transverse band of white on each elytron. Pygidium rather coarsely, rugosely punctured, very sparsely clothed with brownish hair, with an indistinct median stripe of white. Body beneath sparsely pubescent, coxal plate coarsely punctured at outer third. Length .08 inch; 2 mm.

Closely allied to *cruciger*, but more oval, with different vestiture, and the elytra truncate at apex.

One specimen, Arizona. I have a smaller specimen from Florida which does not seem distinct.

Z. subnitens n. sp.—Form rather oval, slightly convex, black, rather shining, sparsely clothed with short, brownish pubescence. Antennæ three-fourths the length of the body. Thorax rather finely punctulate with numerous coarser punctures over the entire surface except for a small region in front of scutellum. Elytra rather wider at base than the thorax, apices subtruncate, rather deeply striate, the striæ punctured. intervals slightly convex, finely punctulate with a single row of distant coarser punctures on each, very sparsely pubescent. Pygidium rather densely finely punctulate with coarser punctures near the sides, very sparsely pubescent. Body beneath shining, very sparsely pubescent. Coxal plate not coarsely punctured externally. Length .08 inch; 2 mm.

A little smaller and rather more convex than *obliteratus*, with more shining surface and less pubescence. There is no trace of elytral band.

Three specimens, Georgia.

Z. densus n. sp.—Closely related to *subnitens* and differing as follows: Form more quadrate, surface more shining with very little pubescence. Antennæ three-fourths as long as the body. Elytra subtruncate at apex, striæ less deep than usual, intervals very flat rather densely punctulate. Pygidium densely punctulate at middle, rugulose and coarsely punctured at the sides. Body beneath sparsely pubescent. Coxal plates not coarsely punctate. Length .06 inch; 1.5 mm.

One specimen, California.

Z. planifrons n. sp.—Form rather oval, black, moderately shining. Front not or extremely feebly carinate. Antennæ half as long as the body, black, the two basal joints usually paler. Thorax rather densely finely punctured, a few coarser punctures at the sides. Elytra separately rounded at tip, striate, striæ punctured, intervals very flat, densely punctulate, pubescence gray, sparse and relatively coarse. Pygidium densely punctulate, a few coarser punctures at the sides, very sparsely pubescent. Body beneath sparsely pubescent. Coxal plates with a very few coarse punctures externally. Length .06 inch; 1.5 mm.

Digitized by Google

The smallest species known to me and separable from those which precede by the very feebly or not carinate front, and by the basal joints of the antennæ paler.

Three specimens, Arizona.

TENEBRIONIDÆ.

CONOECUS n. g.

Front feebly trilobed, middle lobe not prominent, separated from the lateral lobes by a feeble sinuation. Labrum trapezoidal, moderately prominent, narrower in front, a median impressed line. Mandibles visible beyond the epistoma, chisel-shaped at apex, the right mandible toothed on the upper side behind the apex, the left mandible simple. Mentum transverse, arcuate in front, entirely closing the buccal opening beneath. Terminal joint of maxillary palpi triangular. Eyes round, slightly emarginate by the sides of the front, rather coarsely granulated, without supra-orbital ridge. Thorax fitting the base of the elytra. Scutellum small, transverse. Elytra not wider at base than the thorax, oval, narrowed behind, epipleuræ narrow but entire. Prosternum rounded at tip. Mesosternum nearly vertical, slightly concave in front. Metasternum moderate in length, body apterous. Inter-coxal process of abdomen triangular, oval at tip. Legs moderate in length, outer edge of tibiæ rounded, anterior tibiæ slightly broader at tip, the outer angle somewhat prolonged. Posterior tarsi with the first joint shorter than the fourth, tarsi clothed beneath with short silken hairs. Antennæ slender, third joint longer than those following, joints 4–11 gradually shorter and broader, the last three joints being more distinctly broader.

The genus which I have found it necessary to form for an inconspicuous species belongs to the tribe Gnathosiini as indicated in the Class. Col. N. A. ed. ii. p. 361. By the system of Lacordaire the genus should be referred to his group Tribolocarides (Genera v, p. 69), and seems by description most nearly related to Eremoecus, a Chilian genus, from which it differs in the middle lobe of the front being rounded, by the absence of the supra-orbital ridge, and the structure of the mandibles.

In the table of genera (Classif. p. 362) Conœcus is more nearly related to Trimytis. The latter genus has the middle lobe of the front prominent, both mandibles dentate above clasping the sides of the middle lobe of epistoma, the first joint of the hind tarsi is longer than the fourth, and the tarsi spinous beneath.

C. ovipennis n. sp.—Oblong oval, piceous with a very faint bronze tinge surface finely, very sparsely pubescent. Head coarsely, moderately densely punctured, more densely in front. Thorax transverse, about one-half wider than long, base very little wider than the apex, base bisinuate, apex truncate, sides regularly arcuate, hind angles obtuse, disc moderately convex, punctuation finer than on the head, moderately densely placed, denser at the sides. Elytra regularly oval, base not wider than the thorax, disc with coarse punctures arranged in moderately regular rows but somewhat confused about the scutellum. Prosternum coarsely

Digitized by Google

and deeply punctured, flanks of prothorax granular. Metasternum at sides densely coarsely punctured. Abdomen coarsely but not densely punctate. Legs sparsely punctate. Length .20–.30 inch; 5–7.5 mm. (Pl. 5, fig. 12.)

Four specimens, Texas.

ZOPHERUS Lap.

Z. granicollis n. sp.—Form moderately elongate, black, surface with slight velvety aspect. Head very coarsely but sparsely punctate. Thorax oval, as wide as long, sides in front slightly arcuate, posteriorly gradually coarctate, the margin posteriorly coarsely crenulate, disc moderately convex with numerous tubercles regularly and moderately closely placed over the entire surface, each tubercle punctate on its posterior aspect. Elytra regularly oblong oval, not wider than the thorax, apex tuberculate on each side, surface with numerous tubercles very regularly disposed and rather closely placed, each punctate on its posterior aspect. Prosternum beneath coarsely tuberculate, the body and abdomen very coarsely not closely punctate. Length .80 inch; 20 mm.

Differs from all our other species by the more coarsely tuberculate thorax and elytra. In all our black species the thorax is sparsely and irregularly punctate except in *opacus*. In the latter the punctures of the thorax are muricate, but the elevations small and distant, and the tubercles of the elytra are also small and distant.

One specimen collected in the north of Lower California near the boundary by Dr. E. Palmer.

RHINANDRUS Lec.

R. sublaevis n. sp.—Form elongate, subdepressed, black with slight velvety aspect, beneath more shining. Head sparsely punctate, punctures much finer at middle, the sides behind the eyes more coarsely punctate, finely granulate opaque, under side triangularly wrinkled. Thorax one-fifth wider than long, base wider than apex, sides arcuate, broadest at middle, slightly narrower and feebly sinuate behind, hind angles sharply rectangular, lateral margin entire, disc moderately convex, very sparsely finely punctulate, a vague ante-basal transverse impression. Elytra wider at base than the thorax and more than three times as long, humeri distinct, sides feebly arcuate, widest at posterior third, surface with nearly obsolete striæ of fine punctures, the intervals flat with extremely minute punctures sparsely placed. Prothorax beneath sparsely punctate near the front angles. Metathorax slightly wrinkled and minutely punctate. Abdomen more distinctly sparsely punctate. Body winged. Length .69 inch; 17.5 mm.

This species bears a notable resemblance to *Nyctobates subnitens* Horn, but is a little broader. The clypeal emargination is deep, nearly semicircular. The other two species known to me have elongate oval elytra, the humeri obliterated and the wings wanting.

Two specimens, Arizona.

Digitized by Google

HELOPS Fab.

H. strigicollis n. sp.—Moderately elongate, piceous, feebly shining, legs and coxæ ferruginous. Antennæ very little longer than the head and thorax, brownish, outer joints slightly broader. Head coarsely and densely punctured in front, longitudinally deeply strigose posteriorly. Thorax one-half wider than long, apex and base equal, sides feebly arcuate, apical and basal angles obtuse, surface deeply longitudinally strigose. Elytra oblong oval, not wider than the thorax, sides feebly arcuate, surface moderately deeply striate, striæ punctate, intervals slightly convex, slightly wrinkled, irregularly biseriately punctulate, these small punctures with fine inconspicuous hairs. Prothorax beneath coarsely punctured at middle, longitudinally strigose at the sides. Body beneath coarsely punctate. Abdomen less coarsely punctate and more shining. Femora sparsely punctate, the tibiæ more densely. Body apterous. Length .31-.42 inch; 8–10.5 mm.

This species has the thorax as wide as any portion of the elytra, and is unique in our fauna in the sculpture of its upper surface. It is related to *Bachei* and *rugicollis*, and should be placed between them.

Three specimens from the southern part of California, probably near San Diego.

CURCULIONIDÆ.

ORCHESTES Illig.

O. betuleti n. sp.—Black, subopaque, abdomen and elytra clear red, tarsi and antennæ pale yellow. Rostrum coarsely punctured, smoother and vaguely bisulcate in front, head coarsely and deeply punctured, very sparsely pubescent. Thorax wider than long, much narrower in front, sides arcuate, median line finely impressed, surface coarsely and deeply punctate, very sparsely pubescent. Scutellum black. Elytra oval, one-third longer than wide, striate, striæ coarsely and closely punctured, intervals scarcely wider than the striæ, flat, irregularly biseriately punctulate, surface shining, very sparsely indistinctly pubescent. Body beneath black, coarsely punctate, more distinctly pubescent than above. Abdomen entirely red, obsoletely punctate. Legs black, coarsely punctured, posterior femora stouter than the middle and with two dentiform tubercles at middle beneath. Antennæ pale yellow, the club fuscous, funiculus six-jointed. Length .11 inch; 3 mm. nearly.

Among the few species in our fauna this is readily distinguished by its color. There are several species in Europe similarly colored, from all of which it seems to differ.

Three specimens, Washington, D. C., given me by Mr. E. A. Schwarz, collected on *Betula nigra*.

Digitized by Google

Description of Plates.

PLATE IV.

Fig. 1.—Cremastochilus spinifer, n. sp.
" 2.— " planipes, n. sp.
" 3.— " saucius, Lec.
" 4.— " ineptus, n. sp.
" 5.—Orizabus Snowi, anterior tibia.
" 6.— " ligyroides, anterior tibia.
" 7.—Tarsal claw of *Phytalus laevigatus*, Bl.
" 8.— " " " *debilis*, Horn.
" 9.—Ulkeus intricatus Horn, upper side.
" 10.— " " under side.
" 11.— " " antenna, upper side.
" 12.—Hetaerius Blanchardi Lec., antenna.
" 13.—Tyndaris cincta, Horn.
" 14.—Schizopus Sallei, Horn.
" 15.—Chrysobothris contigua Lec., front.
" 16.— " cuprascens Lec., front.
" 17.— " ignicollis Horn, front. The usual form of clypeus in Chrysobothris.

PLATE V.

Fig. 1.—Stolonis Ulkei, Horn.
" 2.—Platynus quadrimaculatus, Horn.
" 3.—Brachylobus caurinus, Horn.
" 4.— " lithophilus, Say.
" 5.—Lebia pectita, Horn.
" 6.— " depicta, Horn.
" 7.— " (*Metabola*) vivida, Bates.
" 8.— " vittata, Fab.
" 9.— " " var. *Spraguei*, Horn.
" 10.— " scapula, Horn.
" 11.—Scydmaenus deformatus, Horn.
" 12.—Conoecus ovipennis, Horn.
" 13.—Pyrota mylabrina, Chev.
" 14.— " Engelmanni, Lec.
" 15.— " postica, Lec.
" 16.— " dubitabilis, Horn.
" 17.— " insulata, Lec.
" 18.— " limbalis, Lec.
" 19.— " lineata, Oliv.
" 20.— " discoidea, Lec.
" 21.— " Germari, Hald.
" 22.— " bilineata, Horn.
" 23.— " sinuata, Oliv.
" 24.—Palpi of *P. insulata*.
" 25.—Languria, *a* thorax of *L. divisa* Horn, *b* tips of elytra of *Langurites lineatus* Cast.

Digitized by Google

On the species of CANTHON and PHANÆUS of the United States with notes on other genera.

BY FREDERICK BLANCHARD.

CANTHON Hoff.

The genus *Canthon* is peculiar to America, and is largely represented in the tropical region, nearly a hundred species having been described by Harold in his monograph. Berliner Ent. Zeit. 1868, vol. xii.

The clypeus in this genus is separated from the genæ, or sides of the head, by a suture extending from some distance within the eyes obliquely outward. In many of the species with four clypeal teeth the margin of the head is strongly indented at the suture making the genæ more or less acute and prominent, when the clypeus has been said to be sex-dentate; but in the following table reference will be made to the clypeus as quadri-dentate or bi-dentate.

The prothorax beneath exhibits two forms. In one the sides in front of the middle are distinctly transversely carinate and anteriorly smooth and deeply concave for the reception of the femora, and the side margin is entirely glabrous. I have followed the example of LeConte in using this character primarily to separate two species, although Harold only uses it subsidiarily in the classification of minor groups in different parts of the genus. In the other form the sides are smooth, or with traces of an imperfect carina, not constant in the same species, extending from the coxæ outward; anteriorly there is a moderate concavity always more or less hairy, and near the side margin is a fringe of hairs. There is usually a small tubercle or denticle beneath, towards the anterior angle which is formed by an abrupt termination of a slight inferior thickening of the side margin in front.

The eighth or subhumeral stria of the elytra in some species is finely carinate at its antertor third or half; best observed when viewed laterally from the same side. Usually the carina is external and the stria visible, but in *LeContei* the stria is represented in front only by the carina.

The anterior tibiæ in the males of two species, and in the females of all, have a single acute spur, sulcate on the outer side and curved outward. With the two exceptions noted, in the males the spur is broad at apex, more or less deeply emarginate, usually somewhat excurved and

Digitized by Google

with the outer angle more acute. Generally the males may also be distinguished by the pygidium being more deflexed and slightly longer, and by the last ventral more deeply emarginate.

The hind thighs in some species have a distinctly impressed line beneath, near and parallel with the front margin, and are then said to be margined.

Table of Species.

Sides of prothorax beneath without entire transverse carina, and fimbriate with hairs near the margin .....2.
Sides of prothorax beneath with entire transverse carina.....9.
2.—Posterior thighs not margined in front; clypeus quadridentate; size small or moderate; color black.....3.
Posterior thighs margined in front.....8.
3.—Hind tibiæ with two spurs.....1. **nigricornis.**
Hind tibiæ with a single spur.....4.
4.—Sutural indentation of clypeus deep, acute; prothorax with denticle on the under side margin towards the apex .....5.
Sutural indentation of clypeus feeble, obtuse; no subhumeral carina; no prothoracic denticle.....8. **simplex.**
5.—Subhumeral stria not carinate; coarsely granulate, spurs of anterior tibiæ alike in the sexes.....6.
Subhumeral stria carinate.....7.
6.—Prothorax more coarsely granulate; outer striæ of elytra deeper, hind femora setigerous punctate.....2. **ebenus.**
Prothorax rather more densely and less coarsely granulate; outer striæ of elytra not deeper than the discal; hind femora sparsely punctate, setæ fine. 3. **depressipennis.**
7.—Upper surface granulate; hind thighs coarsely setigerous punctate. 4. **praticola.**
Not granulate; hind thighs coarsely setigerous punctate.
Very smooth, almost shining.....5. **probus.**
Distinctly opaque.
Thorax punctate.....6. **puncticollis.**
Thorax impunctate, scabrous or alutaceous.....7. **LeContei.**
8.—Clypeus quadridentate, the two middle teeth slender, acute; hind tibiæ strongly arcuate; bright green or deep blue.....9. **cyanellus.**
Clypeus bidentate.
Upper surface granulate.
Eyes larger; antennæ ferruginous.....10. **vigilans.**
Eyes normal; antennæ fuscous.
Granules of prothorax distinct; pygidium and last ventral granulate. 11. **laevis.**
Prothorax finely scabrous, without distinct granules; pygidium and last ventral smooth.....12. **chalcites.**
Smooth, subopaque, bright green or deep blue.....13. **indigaceus.**
9.—Clypeus bidentate, bright green or bronze.....14. **viridis.**
Clypeus quadridentate; eyes larger; brown bronze, shining.15. **perplexus.**

Digitized by Google

Mr. Samuel Henshaw has kindly assisted in compiling the following bibliography, and also that of the species of *Phanaeus*.

CANTHON.

Hoffmansegg, Wiedem. Zool. Mag. 1817, I, p. 38.

1. **C. nigricornis** Say (*Ateuchus*), Jour. Acad. 1823, ser. 1, III, p. 207; ed. Lec. 1869, II, p. 133; Lec., Col. Kans. 1859, p. 10; Harold, Berl. Ent. Zeit. 1868, XII, p. 23; Horn, Trans. 1870, III, p. 45; *C. latimanus* Dej., Cat. ed. 3, 1836, p. 152; *C. ateuchoides* Sturm, Cat. 1843, p. 104.

This species was the only one known to Harold with two spurs on the hind tibiæ. Length 6–9 mm. C. W., Mass. to Fla. and westward to Neb., Kans. and Texas.

2. **C ebenus** Say (*Ateuchus*), l. c. p. 208; ed. Lec. II, p. 134; Lec. l. c.; Harold, l. c. p. 65; Horn, l. c. p. 46.

Dr. Horn has called my attention to a clerical error in his table whereby the primary characters used to separate this and the next species became transposed. They should appear as in the table herewith. In this species and to a less degree in the next, the fimbriæ of the side margin of the thorax beneath are continued and diffused inwardly along the hind margin for a short distance, and similar hairs occur upon the inner part of the mesosternal epimera. Length 7–11 mm. Penn., La., Me., Kans., Texas, N. M., Ariz.

3. **C. depressipennis** Lec., l. c. p. 11; Horn, l. c.

Length 7–10 mm. Ga., Fla., Da., Kans.

4. **C. praticola** Lec., l. c. p. 10; Horn l. c. p. 45.

Length 7–9 mm. Neb., Kans., Col., Texas, N. M., Ariz.

5. **C. probus** Germ. (*Ateuchus*), Spec. Nov. 1824, p. 98; Harold, l. c. p. 64; Horn l. c. p. 45; *C. abrasus* Lec., l. c. p. 11; *C. minor* Sturm, Cat. 1843, p. 104.

Length 6 mm. Ky., S. C., Ga., Fla.

6. **C. puncticollis** Lec., Proc. Acad. 1866, p. 381; Horn, l. c. p. 45.

Length 6–7 mm. Ariz., L. Cal.

7. **C. LeContei** Harold, l. c. p. 68; Horn, l. c. p. 46.

Length 5–6 mm. Texas.

8. **C. simplex** Lec., Pac. R. R. Rep. 1857, App. I, p. 41; Col. Kans. 1859, p. 11; Harold, l. c. p. 128, Horn, l. c. p. 46; *C. corvinus* Har., l. c. p. 129.

Var. **simplex** Horn, l. c.—Surface entirely opaque, thorax impunctate.

Oreg., Cal.

Var. **corvinus** Horn, l. c.—Surface opaque, thorax punctate.

Col., Utah, Ariz., Cal., Oreg.

Var. **militaris** Horn, l. c.—Surface less opaque, thorax less punctured, humeri red.

Cal.

Digitized by Google

Var. **humeralis** Horn, l. c.—Surface less opaque, thorax less punctured and shining, humeri polished.

Cal.

Length 6–9 mm. Yellowstone Lake, Idaho, Vanc., Sonora.

9. **C. cyanellus** Lec., Col. Kans. 1859. p. 11; Horn. l. c. p. 45; *C. speciosus* Harold, l. c. p. 41.

Outer edge of subhumeral stria finely carinate; no denticle on the lower margin of prothorax. Length 7–9.5 mm. Texas. (Mex. Harold)

10. **C. vigilans** Lec., Jour. Acad. 1858, ser. 2, IV, p. 16; Col. Kans. 1859, p. 10; Harold, l. c. p. 100; Horn, l. c. p. 47.

In this and the next three species the hind tibiæ appear slightly twisted, the plane of the upper surface being deflexed outward toward the apex. Length 17–22 mm. Mich., Penn., Ga. to Kans., Texas, Col.

11. **C. laevis** Drury (*Scarabaeus*), Exot. Ins. 1770, I, p. 79, pl. 35, fig. 7; ed. Westwood, 1837, I, p. 73, pl. 35, fig. 7; Oliv., Ent. 1789, I, p. 160, pl. 10, fig. 89; Lec. (*Canthon*), Col. Kans. 1859, p. 10; Harold, l. c. p. 99; Horn, l. c. p. 47; *Sc. pilularius* De Geer, Mem. Ins. 1774, IV, p. 311, pl. 18, fig. 14; *Sc. hudsonius* Forst., Cent. Ins. 1781; *Ateuchus volvens* Fabr., Syst. El. 1801, I, p. 60; Lap. (*Canthon*), Hist. Nat. II. p. 68; Candéze, Mem. Soc. Liege 1861, XVI, p. 345, pl. 2, fig. 2 (larva); *C. obtusidens* Zieg., Proc. Acad. 1844, II, p. 45; var. *viridescens* Horn l. c. p. 47.

Northern and eastern specimens are usually black with a dull coppery tinge. South and west occur black, deep blue and dull and bright green varieties. The spur of the anterior tibiæ of the male in this species and in the last is rather more excurved than usual, the sides nearly parallel, the outer angle acute and longer than the inner which is also acute. Length 10–19 mm. N. Eng. to S. Cal.

12. **C. chalcites** Hald., Proc. Acad. 1843, I, p. 304; Lec., Col. Kans. 1859, p. 10; Horn l. c. p. 47.

The surface of the thorax is finely scabrous and without distinct granules. The spur of the front tibiæ of the male is broad at apex, moderately emarginate, the outer angle acute, scarcely longer than the inner which is broad and rounded. In the male the front tibiæ are much longer and more arcuate, and the middle tibiæ distinctly longer than in the female. Length 13–20 mm. N. C., Ga., Kans., Texas, N. Ill., Mo., Neb., La., Ind. Terr.

13. **C. indignaceus** Lec., Proc. Acad. 1866, p. 280; Horn l. c. p. 45.

Owing to the very bad condition of the type, by an error in observation, the hind tibiæ have been said by Dr. Horn to have two spurs. Reference to the type and the examination of many other specimens show that there is never in reality but a single spur. The pygidium of the male is concave before and very strongly convex at posterior two-

Digitized by Google

thirds. In the female the form of the pygidium is similar, but distinctly less convex. Fresh specimens appear to be of a bright green, which is subject to change to a deep blue when the specimens are long immersed in alcohol, as I am informed by Dr. G. M. Levette, who has demonstrated the fact by actual experiment. The deep blue of certain specimens of *C. cyanellus* is undoubtedly due to the same cause. *C. Chevrolatii* Harold (Mex. and Gua.) appears to be allied to this differing by the more polished surface and evenly and moderately convex pygidium of the male. Length 9–11 mm. Ariz.

14. **C. viridis** Beauv. (*Copris*), Ins. Afr. et Amer. 1805, p. 23, pl. 3, fig. 2; Lec., Col. Kans. 1859, p. 11; Harold, l. c. p. 112; Horn, l. c. p. 47; *Ateuchus obsoletus* Say, Jour. Acad. 1823, ser. 1, III, p. 208; ed. Lec. 1869, II, p. 133; *Onthophagus viridicatus* Say, Bost. Jour. 1835, I, p. 173; ed. Lec. 1869, II, p. 648; *C. viridulus* Dej., Cat. 3d ed. 1836, p. 152; *C. metallicus* Sturm, Cat. 1843, p. 104.

Hind thighs not margined in front. Length 4–5 mm. S. and W. States, Central Amer.

15. **C. perplexus** Lec. Jour. Acad. 1847, ser. 2, I, p. 85; Col. Kans. 1859, p. 11; Harold, l. c. p. 67; Horn, l. c. p. 46; *C. cuprascens* et *C. humilis* Dej., Cat. ed. 3, p. 152.

The hind thighs are said by Harold to be not margined in front, but in the specimens examined by me the marginal line although fine is distinct. Length 5–5.5 mm. Cal., Ill., Ark., Texas, Mex., Yucatan.

PHANÆUS McLeay.

As descriptions of our species of *Phanaeus* have not hitherto been brought together, it is hoped that the following notes and table may be of interest.

Fully developed males sometimes exhibit the most marked differences among the species, but these are not always available for study, and in the table little attention has been given to the male characters. The anterior tarsi are always absent in the males, but have been found to be present in the females of our species except in *pluto*, in which they were missing in the few specimens examined. The joints of the anterior tarsi of the females are smooth and subcylindrical, the first longer and a little stouter, the second, third, and fourth subequal, the fifth longer, somewhat compressed, and in the specimens examined with the apex rounded (*igneus*), truncate (*differmis carnifex*), or (*quadridens, triangularis, mexicanus*) more or less oblique, the lower angle being produced and acute in the last form. The last joint has two or more long setæ at the tip, and there is also not infrequently a seta on the inferior apical angle of one or more of the short intermediate joints. To show the extent of

Digitized by Google

variation of the number and position of the tarsal setæ in the same species, the result of the examination of thirteen females of *P. triangularis* may be instanced: In eight specimens the last joint was bisetose. In one specimen the last joint of the left tarsus was bisetose, and that of the right trisetose. In another the last joint of the left tarsus was trisetose, the extra seta shorter and finer, and that of the right bisetose. Finally two specimens had the last joint bisetose and the third joint of both tarsi with a single seta at lower apical angle.

Table of Species.

Clypeus deeply emarginate and with two long teeth in the emargination; black, opaque; hairs beneath distinctly ferruginous..... **Pluto.**

Clypeus at most feebly sinuate in front.

Elytra smooth, shining, obsoletely striate; dark green or blue, club of antennæ fuscous..... **quadridens.**

Elytra coarsely, deeply and more or less confluently punctured; striæ distinct; club of antennæ pale rufous.

Hind angles of thorax broadly rounded; side margins in front irregularly serrate; declivity of thorax with the sides converging behind in well developed males..... **difformis.**

Hind angles as usual, distinct, obtuse; side margins entire, declivity with sides diverging behind in well developed males..... **carnifex.**

Elytra not deeply punctate, intervals more or less convex.

Thorax densely granulate; club of antennæ fuscous; intervals of elytra feebly convex and with subobsolete, coarse, shallow, more or less confluent punctures..... **triangularis.**

Thorax rugose or scabrous; intervals of elytra more convex.

Club of antennæ pale rufous; intervals punctate, much as in *triangularis*. **igneus.**

Club of antennæ fuscous; elytra deeply striate, intervals very convex, nearly smooth, sparsely punctulate..... **mexicanus.**

PHANÆUS.

McLeay, Hor. Ent. 1819, I, p. 124.

1. **P. Pluto** Harold, Ann. Soc. Ent. Fr. 1863, series IV, vol. III, p. 164; *morio* Lec., Smith. Misc. Coll. VI, p. 36.

Length 21 mm. Ariz., Mex. (Tamaulipas)

2. **P. quadridens** Say (*Copris*), Bost. Jour. 1837, I, p. 176; ed. LeConte II, p. 650; *P. violaceus* Laporte, Hist. Nat. II, p. 81; *laevipennis* Sturm, Cat. 1843, p. 334, pl. 2, fig. 3; *evippus* Dej. Cat. 1836, 3 ed., p. 155.

Length 16–20 mm. Ariz., Mex.

3. **P. difformis** Lec., Jour. Acad. 1847, series II, v. I, p. 86.

Varies in color, with thorax green and elytra blue, or thorax cupreous and elytra green. Intervals of elytra not costate.

Length 19–20 mm. Texas, N. Mex.

Digitized by Google

4. **P. carnifex** Linn. (*Scarabaeus*), Syst. Nat., ed. 12, 1767, v. I, pt. 2, p. 546; Drury, Ill. Exot. Ins. 1770, I, pl. 35, fig. 3-5; ed. Westwood, 1837, v. I, p. 72, pl. 35, fig. 3-5; Fabr. Syst. Ent. 1775, p. 26; Spec. Ins. 1781, v. I, p. 29; Mant. Ins. 1787, v. I. p. 15; Syst. El. 1801, v. I, p. 48; Oliv. Ent. 1789, v. I, p. 135, pl. 6, fig. 46, pl. 10, fig. 86; Voet. Col. pl. 26, fig. 31, 32; Jabl., Col., v. II, pl. 15, figs. 4, 5; Beauv. Ins. p. 198, pl. 3, figs. 8, 9; MacLeay, Hor. Ent. 1819, I, p. 132; *vindex* McLeay, l. c. p. 133.

Usually with the thorax bright cupreous and the elytra green. In eastern specimens the intervals of the disc of the elytra are more or less costate, but in the west specimens occur with the intervals flat and entirely without costæ, thus resembling the last.

Length 12-22 mm. Atlantic States to Rocky Mts.

5. **P. triangularis** Say (*Copris*), Jour. Acad. 1823, series I, v. III, p. 206; ed. Lec. II, p. 132; Lec. Jour. Acad. 1847, series II, v. I, p. 85; *torrens* Lec. (variety), l. c.; Proc. Acad. 1854, v. VII, p. 217; *eudoxus* Dej. Cat. ed. 3, p. 155.

Eudoxus has been used as a cabinet name for a var. of the next species. Opaque, black, dull cupreous, or greenish.

Length 16–21 mm. Mo., Kans., Texas.

6. **P. igneus** McLeay, Hor. Ent. 1819, v. I, p. 133; *nigrocyaneus* McLeay i. litt.; *tityrus* Dej., Cat. 1836, ed. 3, p. 155; *scabripennis* Sturm, Cat. 1843, p. 106.

Moderately shining, entirely black, thorax green and elytra black, or thorax green or more or less cupreous and elytra green.

Length 16–20 mm. Ga., Fla.

7. **P. mexicanus** Harold, Ann. Soc. Ent. Fr. 1863, series IV, v. III, p. 171; *mexicanus* Klug. Dej. Cat. ed. 3, p. 155.

Shining green or cupreous. The male when well developed is said to differ from allied Mex. species by having in the middle of the subconvex disc of the thorax a bituberculate transverse carina anterior to which and nearer to it than to the apical margin is a small tubercle, the position of which as indicated is peculiar to this species. On the hind part of the declivity are two prominent arcuate teeth with the apices more or less produced forward.

Length 19–24 mm. Ariz., Mex.

Miscellaneous Notes.

PLATYCERUS AGASSII Lec.—The two sexes of this species differ far less than is usual in the genus. There is no notable difference in the form of the head nor in the mandibles. The antennal club is purely 3-jointed in both sexes, much broader in the male, and one and a half times the length of the preceding six joints of the funiculus. In the female the club is barely longer than the funiculus. In form the female

Digitized by Google

is more robust, the elytra more oval, the thorax coarsely punctured, the punctures, however, not closely crowded. The thoracic punctuation of the male is very closely crowded.

CHOERIDIUM.—*Canthon perplexus* Lec., as mentioned by its author although very much smaller, bears a striking resemblance in appearance to Choeridium. This resemblance is further increased by some of the details of structure in the latter genus which may be worthy of mention.

The male of *C. histeroides* Web., has the spur of the anterior tibiæ dilated in the form of a small circular disc sessile and strongly deflexed, while in the female the spur is slender and more or less acute. The pygidium in the male is less broadly rounded at the tip than in the female and the last ventral is more evidently emarginate.

In *C. LeContei* Harold, which Dr. Horn says, Trans. v, 137, differs from *C. histeroides* by having the hind angles of the thorax much more broadly rounded and the margin at the angle very feeble and not at all reflexed as in the latter, the spur of the male anterior tibiæ is also dilated and deflexed, but is less rounded in front and distinctly produced and angulate exteriorly, and it is very thin and translucent. In some females the spur has been observed to be wider and truncate at apex, while in others it is acute and straight or slightly incurved. It may be remarked here that the anterior spur with age is liable to be more or less worn in all of the *Coprini*, so that in *Canthon*, for instance, it would sometimes be impossible to determine the sex from the form of the stump remaining.

The pygidium in *C. LeContei* is very evidently more convex, especially in the female, and more inflexed at tip than is normally the case in *C. histeroides*.

Our species of *Choeridium* have the propleuræ transversely carinate, as in some species of *Canthon*, and anteriorly concave and abruptly ascending.

Although the presence of a propleural carina in certain genera of *Coprini* seems not to have been considered by systematists of very great importance in classification it is suggested with diffidence owing to lack of knowledge of exotic forms, that it may perhaps afford some clew to the inter-relations of those genera. With this in mind it would appear natural to reverse the order given in our lists of the species of *Copris*, placing *Copris* proper in which the carina is present next after *Choeridium* and *Copris* (*Pinotus*) *carolina* in which it is absent before *Phanaeus* which in this respect is similar and which also resembles the latter subgenus in having the elytra seven-striate.

Digitized by Google

COPRIS PROCIDUA Say.—Dr. Horn has mentioned to me the occurrence from Texas to Costa Rica of what appears to him to be *Copris procidua* Say, described from Mex., Bost. Jour. 1837, I, p. 176; ed. Lec. II, p. 650. Two males are before me from Texas and Guatemala. They resemble *C. remotus* but differ chiefly by having the horn on the head more advanced in position and behind it an acute tubercle, which in Say's type was more developed and inclined forward, and by having the hind tarsi of the usual form and not shorter and broader. The spurs of the front tibiæ are obtuse and flattened, at tip slightly incurved and concave beneath.

HOPLIA TRIFASCIATA Say.—In examining a series of this well known species it will be noticed that there is considerable variation in the number and form of the scales. In the males the upper surface is hairy either entirely without scales or with a few of the hairs replaced by small scales, especially before and behind the middle of the elytra where the scales are the most thinly placed in the female. In the females commonly found in Massachusetts the thorax is quite thickly clothed with erect hair more or less intermixed with scales which are broader than those of the elytra where they are usually arranged more densely in a basal, median and posterior band. Beneath, the scales are narrowly oval or rounded in form in different specimens, more thickly placed on the abdomen, but not at all crowded. Anteriorly the under surface is moderately clothed with hairs.

In an extreme variety from an elevation of 2000 feet in the White Mountain region of N. H. where the specimens occurred on the flowres of *Pyrus arbutifolia*, or chokeberry, the males have a larger proportion of scales on the upper surface and the females have the head and elytra more scaly and the thorax and entire under surface very densely clothed with yellowish rounded scales which are very much imbricated, and the pubescence is much less obvious.

Another form of the female from Mass. presents a very fair instance of dimorphism, the upper surface being simply hairy or with very feeble development of scales thus simulating the male in appearance and it would be naturally associated with specimens of that sex, without careful observation, as slightly immature examples, the color being not quite so dark.

In conclusion it may be observed that as mentioned by LeConte the middle tibiæ of the female have a distinct spur, while in the male they are unarmed. The male differs further by the stouter tarsi and claws, the anterior claws especially being much larger.

Digitized by Google

ALLORHINA MUTABILIS Gory and A. NITIDA Linn. The two species which bear these names in our cabinets are not correctly separated by most collectors. The first is found only in the extreme southwest of our territory, in Texas and Arizona. It is usually larger in size and of more robust facies than *nitida*, and similar in color, but is more apt to have the sides of the elytra more widely ochreous, or the entire surface may be of that color or ferruginous. The clypeal horn is usually longer, broader at its free end, and frequently feebly emarginate. The side margin of the thorax is more widely beaded and more obtuse, especially near the base. The median lobe of the base of the thorax is shorter and more obtusely rounded at apex. *A. nitida* occurs in the entire Atlantic region extending to Texas. The clypeal horn is usually narrower at tip, obtuse, but sometimes quite acute. The bead of the lateral margin is always very narrow, almost obsolete in front and never broad and thick posteriorly. There are other species in Mexico allied to these but it is impossible at present to fix the limits of true species until all are studied with abundant material.

EUPHORIA SUBTOMENTOSA Mann. and LEUCOGRAPHA G. et. P. Dr. Horn requests that I here announce the occurrence of these two species in Arizona in sufficient numbers to warrant their introduction into our lists.

E. leucographa is similar in form and sculpture to *melancholica*, but is rather less robust. Its general color is reddish brown with slight metallic lustre, the thorax with two discal piceous spaces, the elytra with narrow undulating bands of whitish pubescence as in *sepulchralis*.

E. subtomentosa is of the form of *sepulchralis*, the color piceous or nearly black, varying to pale reddish brown with numerous patches of white arranged so as to form a design very nearly resembling the disposition of the yellow and black colors on the elytra of *E. Kernii*.

Digitized by Google

Descriptions of some new CERAMBYCIDÆ with notes.

BY GEORGE H. HORN, M. D.

A few new species of Cerambycidæ have accumulated since the publication of the posthumous memoir of Dr. LeConte, descriptions of which will be found in the following pages. In order that some of the genera might be better understood new studies have been prepared, and these with the tables already published give very nearly all our species in synoptic form.

The discovery of some hitherto unobserved characters in Monilema suggests the hope that something may yet be done to render the descriptions of the Mexican species intelligible.

HYPEXILIS n. g.

This name is proposed for a small species allied to Gracilia and Exilis with the following special characters:

Antennæ ♂ twice as long as the body, joints 3–11 gradually increasing in length. Eyes moderately prominent, coarsely granulated, deeply emarginate. Maxillary palpi much longer than the labial, the terminal joint broad, securiform; last joint of labial narrowly oval, truncate at tip. Femora clavate; first joint of hind tarsi longer than the next two.

In all other characters the species resembles Gracilia. The structure of the maxillary palpi relates it more closely to Exilis, but the structure of the antennæ (the third joint being shorter, not longer than the fourth) and the broader head are sufficient to separate it.

H. pallida n. sp.—Slender, pale testaceous. Head across the eyes wider than the thorax, surface coarsely punctured. Thorax elongate, one-third longer than wide, sides at apical third parallel, then gradually wider to two-thirds, arcuately narrowing to base which is slightly wider than the apex, disc slightly flattened posteriorly, surface rather coarsely punctured and rugulose. Elytra wider than the thorax, humeri distinct, sides straight, slightly converging, apices separately rounded, suture at tip slightly dehiscent, disc rather flat, a vague elevation from the humeri to near the tip, surface evenly and closely punctate, more finely than the thorax. Thorax beneath coarsely but sparsely punctate, abdomen shining, very sparsely punctate. Length .22 inch; 5.5 mm.

More slender than *Gracilia pygmæa*, more coarsely punctured and paler.

One specimen ♂, given me by Mr. Charles Wilt, collected in Texas.

Digitized by Google

GRACILIA Serv.

G. obliquata n. sp.—Form slender, pale brownish testaceous, subopaque. Head behind the eyes moderately coarsely punctate. Thorax oval, a little longer than wide, slightly narrower at base than apex, sides moderately arcuate, disc feebly convex, a vague median sulcus and one on each side oblique, slightly in front of middle, surface moderately coarsely punctate. Elytra slightly wider than the thorax, sides parallel, apices separately rounded, disc subdepressed, a vague oblique depression on each side from the humeri to the suture, surface finely pubescent, rather sparsely punctate, the intervals very finely granular, apices nearly smooth. Thorax beneath coarsely not closely punctate. Abdomen moderately shining, very sparsely punctate. Femora very strongly clavate. Length .20 inch; 5 mm.

A species somewhat more robust than *pygmæa*, with more strongly clavate femora and oblique impressions at the sides of thorax and base of elytra.

One specimen given me by Mr. A. S. Fuller, collected in Texas.

METALEPTUS Bates.

M. Batesi n. sp.—Black, opaque, sparsely clothed with fine, short, gray pubescence with longer erect hairs sparsely intermixed, more abundant on the thorax, elytra at base and entire lateral margin red. Head and thorax coarsely and roughly punctured, the lateral spine small but acute. Elytra coarsely and densely punctured, the apices conjointly rounded. Body beneath coarsely punctured, more densely pubescent. Length .40–.52 inch; 10–13 mm.

Male.—Antennæ slender, about one and a half times the length of the body, 12-jointed.

Female.—Antennæ 11-jointed, stouter, not longer than the body, the last four joints subserrate, eleventh joint obliquely emarginate at tip.

This species so reproduces the form and color of *M. angulatus* that the two might be placed together, except that the punctuation of the upper surface is here much coarser and rougher, and the tips of the elytra are sinuously truncate in *angulatus*.

The genus *Metaleptus* is rather briefly described by Mr. Bates (Trans. Ent. Soc. Lond. 1872, p. 192), and the antennæ are said to be 11-jointed, the terminal joint appendiculate. In the species before me there is a distinct articulation between the last two joints.

I have dedicated this species to my friend, H. W. Bates, as an evidence of my appreciation of his recent work in the Biologia Centrali-Americana.

Occurs in Arizona. Morrison.

M. angulatus Chev.—A specimen of this species was sent me by Dr. Dohrn, said to have been collected in southern California. I do not know of any other specimens having been taken even near the borders of our territory.

Digitized by Google

Metaleptus is allied to Purpuricenus, and differs from it in the absence of antennal tubercles in the male and the pubescent surface. From Tragidion it differs in the absence of sulci or costæ on the elytra, and by the more prominent genæ.

OXOPLUS Lec.

O. jocosus n. sp.—Beneath black, body above (except head) red, elytra with the basal margin narrowly and a broad common sutural band extending three-fourths to base, black, surface sparsely pubescent. Head coarsely, roughly punctured. Thorax densely, cribrately punctured, the apical and basal margins narrowly bordered with black. Elytra slightly narrower posteriorly, the apex obtusely truncate, the sutural angle distinct but not prominent, surface very coarsely and not closely punctured near the base, the punctures gradually finer toward the apex and much denser. Body beneath (except prothorax) black, rather sparsely punctured and with moderately long fulvous pubescence. Length .48–.60 inch; 12–15 mm.

Male.—Antennæ one and a fourth times the length of body.

Female.—Antennæ three-fourths the length of body.

The only variation in color is in one specimen in which the thorax has five black spots, two adjoining the apical and three the basal margin. The general style of coloration resembles that of *Crossidius discoideus*, except that the discal space of the elytra does not extend narrowly along the suture to the base.

Colorado and Arizona.

Four species of this genus are now known to me from our fauna they may be separated in the following manner:

Thorax black, the tips of the tubercles red.

Elytra very densely punctate, color black, the basal margin and the side three-fourths to apex red. Body beneath at middle and entire abdomen red. Apices of elytra ♂ sinuately truncate, sutural angle rounded.....**marginatus.**

Thorax red, the apical and basal margins sometimes narrowly black.

Abdomen red.

Elytra black, broadly margined with red at base which extends down the side three-fourths to apex; surface densely rather finely punctate; apices sinuously truncate, sutural angle obtuse. Body beneath red, sides of meso- and metasternum browner.....**cruentus.**

Elytra in great part red, a broad black band extending from the apex nearly two-thirds to base; surface rather coarsely not densely punctured; apices truncate, the sutural angle slightly prolonged. Body beneath black, abdomen red.....**corallinus.**

Abdomen and entire body beneath black.

Elytra colored as in *corallinus* with a very narrow basal black band; surface coarsely punctured at base more finely and closely toward apex; apices separately rounded, the sutural angle distinct but not prolonged.

jocosus.

Digitized by Google

O. marginatus Lec. Proc. Acad. 1862, p. 42; .86–.95 inch, 22–24 mm.—Lower California.

O. cruentus Lec. ibid.; .75–.85 inch, 19–21 mm.—Lower California.

O. corallinus Lec. ibid.: .70–.80 inch, 18–20 mm.—Utah and New Mexico.

O. jocosus Horn supra; .48–.60 inch, 12–15 mm.—Colorado and Arizona.

In the first two species I have observed faint traces of costæ on the disc of the elytra near the base.

The genus Oxoplus as stated by LeConte is closely allied to Tylosis, and differs in having the sides of the thorax obtusely spinous and the disc without callosities. In both genera the antennæ are 12-jointed in the males, the terminal joint being longer than the eleventh in Tylosis and shorter in Oxoplus. I am satisfied that in Oxoplus there is a true articulation between the last two joints and that the eleventh is not merely appendiculate. The female antennæ are 11-jointed.

The genus Oxoplus as described by Lacordaire may possibly not be congeneric with that intended by LeConte, the type of ornamentation being so very unlike as to suggest the existence of structural differences on comparison.

TYLOSIS Lec.

In the Biologia (vol. v, p. 81) Mr. Bates speaks of *T. sellata* as a distinct species. The series in my cabinet will not only demonstrate that *maculata* and *sellata* are inseparable, but that the color variation is still greater. In two specimens before me the two median and posterior black spots have become confluent into a large discoidal spot covering fully two-thirds of the entire area of the elytra; from this every variety occurs until nothing remains on the elytra except the two subapical spots.

CROSSIDIUS Lec.

C. humeralis Lec. Journ. Acad. 2, iv, p. 28. "Sordide luteus, pubescens thorace rotundato, longius pubescente, rude punctato, callis parvis duobus notato, elytris dense punctatis, vix obsolete bicostatis, linea brevi humerali nigra ornatis; subtus obscurus, densissime pubescens."

"Dull testaceous, densely pubescent; punctures of elytra dense finer behind, a short humeral vitta black, which in one specimen has a continuation near the tip (indicating that it may be entire in some individuals."—New Species 1873, p. 197.

I reproduce the two descriptions given by Dr. LeConte as important points in the one are omitted in the other. In the first description the two callosities of thorax are noted, in the second the possibility of the humeral stripe becoming an entire vitta is hinted at.

The two specimens in the cabinet of Dr. LeConte have, as far as I know, remained the only ones to which we could refer.

Digitized by Google

Very recently some specimens were sent me from Texas, which from their appearance I had supposed to be new, and within a few days others were sent me by Mr. Merkel for examination which fill the series completely in the color variation.

One specimen before me has the elytra dirty yellow without marks, and excepting the thorax looks not unlike the males of *intermedius;* a second specimen has the short humeral black vitta. The form with the short apical continuation of the humeral vitta is in LeConte's cabinet. There is in Mr. Merkel's collection a specimen with the suture narrowly piceous and the humeral line continuous in a narrow vitta nearly to the tip. Three specimens in my cabinet show the gradual widening of the sutural stripe and the discal vitta until the elytra become almost entirely black with merely the lateral margin and an abbreviated discal vitta yellow.

The thorax has the two callosities always distinct, but as the elytra become darker there are five callosities indicated by the black spots placed as in Tylosis with the addition of two smaller antero-lateral spots.

In the Biologia (v, p. 82) Mr. Bates describes a closely allied species, *trivittatus*, if indeed it is not identical. The faint elytral costæ, of which Mr. Bates makes especial mention, are plainly shown in several of our species, and very distinct in *testaceus*.

STENOSPHENUS Hald.

In a recent study of the specimens which have accumulated in my cabinet six very distinct species were found to be present. With the exception of two which were well known, the others were supposed to be the equivalents of those enumerated by Mr. Bates in the Biologia. This, however, seems not to be the case, and I am quite sure that the species to which the name *cribripennis* had been attached is not that species.

The difference in the sculpture of the prosternum of the two sexes does not seem to have been observed. In its highest development the character consists of a depressed space extending from one side of the prosternum to the other which is densely coarsely or even cribrately punctured, in the male. This space does not extend to the apical margin, and in several species is divided in two by a smooth space extending from the apical margin to the tip of the prosternum. In the females the prosternum is either sparsely punctate or almost smooth. In *S. notatus*, however, there does not seem to be any difference between the two sexes.

Digitized by Google

The following table will enable our species to be separated:

Thorax wider than long, not narrowed at apex.
  Thorax reddish yellow with a discal black spot.....**notatus.**
Thorax as long or longer than wide, narrower in front.
  Punctures of elytra separated by three longitudinal smooth intervals..**lugens.**
  Punctures of elytra dispersed.
    Thorax red, elytra black.
      Femora red.
        Thorax oval, not longer than wide. punctures numerous. Elytra very obliquely truncate, the outer angle spiniform.....**novatus.**
        Thorax oblong, longer than wide, punctures few and inconspicuous. Elytra sinuously truncate, the angles not spiniform..... .....**lepidus.**
      Femora black.
        Thorax oval, very nearly smooth. Elytra less obliquely truncate, the angles sometimes spiniform.....**dolosus.**
    Body and legs pale brownish testaceous.
      Thorax coarsely punctured, a median smooth space only. Elytra obliquely truncate, both angles subspinous.....**debilis.**

S. notatus Oliv.—Black, shining, thorax and under side of head reddish yellow, the former with a large discal black spot, surface sparsely clothed with short yellowish pubescence. Thorax broader than long, apex and base equal, sides rather strongly arcuate, surface sparsely punctured at the sides. Elytra coarsely, sparsely punctured, the punctures a little finer near the tip; apices separately emarginate, both angles acute, the outer somewhat longer. Length .35–.48 inch; 9–12 mm.

In both sexes the prosternum is very sparsely punctate, in some specimens nearly smooth. The antennæ ♂ are one-fourth longer, and those of the female shorter than the body. The discal spot of the thorax is sometimes wanting.

Widely distributed in the Atlantic region.

S. lugens Lec.—Black, shining, head and thorax above and beneath red, surface sparsely pubescent, on the elytra arranged in stripes with the punctures. Thorax oval, a little longer than wide, narrower in front, surface smooth, almost without trace of punctuation. Elytra rather coarsely punctured, the punctures arranged in longitudinal spaces separated by smooth intervals; apices truncate, the inner angle acute, the outer spiniform. Length .48 inch; 12 mm.

In the males the prosternum is smooth at middle, in front of each coxa a more roughly punctured space not sharply limited.

Occurs in Texas.

S. novatus n. sp.—Black, moderately shining, thorax and femora red, sparsely clothed with very short gray hair. Head entirely black, coarsely closely punctate. Thorax oval, not longer than wide, narrower in front, sides moderately arcuate, surface coarsely sparsely punctured except at middle of disc. Elytra coarsely and moderately closely punctured, the punctures equal from base to apex; apices very obliquely truncate, both angles spiniform, the outer longer. Metasternum at sides coarsely sparsely punctate, abdomen sparsely punctate at sides. Length .38 inch; 9.5 mm.

Digitized by Google

In the males the antennæ are nearly twice as long as the body. The prosternum in front of the coxæ, except a smooth band at apex, is coarsely punctured and opaque, and the space so sculptured is depressed.

This is the species which appears in our lists as *cribripennis* Thoms. It is, however, smaller, thorax less elongate and the surface less coarsely punctured.

Resembles the species which I have identified as *rufipes* Bates, from Mexico, but the latter has the thorax more and the elytra less coarsely punctured, and the male has a well limited, oval, coarsely cribrate space on the prosternum in front of each coxa.

Occurs at Cape San Lucas, Lower California.

S. lepidus n. sp.—Entire body beneath black, thorax and femora bright red. Head coarsely, closely punctate. Thorax oblong oval, longer than wide, sides feebly arcuate, surface shining with a few punctures of unequal size irregularly disposed near the sides. Elytra moderately coarsely punctured, the punctures a little deeper and closer near the apex, each bearing a short yellowish hair; apices sinuously truncate, the angles dentiform. Body beneath at sides sparsely punctate, abdomen almost smooth. Femora bright red, piceous at knees, tibiæ and tarsi black. Length .38 inch; 9.5 mm.

The two specimens before me are males, one having the under side of thorax red, the other black. In both the antennæ are nearly one and a half times the length of the body. The prosternum beneath is coarsely, cribrately punctured except a very polished space along the apical border and a nearly smooth line at middle.

Two specimens, Arizona.

S. dolosus n. sp.—Black, prothorax and often the meso-metasternum red. Head coarsely, densely punctured. Thorax oval, a little longer than wide, sides moderately arcuate, disc shining with a very few indistinct punctures. Elytra moderately, sparsely punctured, each puncture with a short yellowish hair; apices obliquely truncate, the angles slightly spiniform. Body beneath sparsely, abdomen very sparsely punctate. Legs black. Length .27–.42 inch; 7–10.5 mm.

In the male the antennæ are one and a third times the length of the body; the prosternum is densely cribrately punctured except a space along the apical border and from that along the middle to the tip of the prosternal process. The female antennæ are nearly as long as the body, the prosternum rather sparsely punctured over its entire surface.

Occurs in southwestern Texas.

S. debilis n. sp.—Entire body and members pale brownish testaceous, very sparsely pubescent. Head coarsely and deeply punctured. Thorax oval, longer than wide, narrower in front, sides feebly arcuate, surface very coarsely but not closely punctate, except a small space at middle. Elytra moderately closely not coarsely punctate, apices truncate, slightly obliquely, the angles sub-spinous. Body beneath very sparsely punctate. Length .30–.36 inch; 7.5–9 mm.

Digitized by Google

The male antennæ are one and a third times the length of the body. The prosternum is cribrately punctured in a depressed space over its entire surface except a narrow space in front and between the coxæ.

Of this species I have two male specimens taken in different years and both the same color which might be supposed to be an indication of immaturity. The species is, however, distinct from the others by the much more coarsely punctured thorax and the sexual characters of the prosternum.

Two specimens, Utah.

Bibliography.

S. notatus Oliv. (*Callid.*) Ent. iv, 70,p. 61, pl. 7, fig. 89.
deflendum Newm. (*Elaph.*) Entomologist p. 6 and 30.
S. lugens Lec. Proc. Acad. 1862, p. 41.
S. novatus n. sp. (*cribripennis* Check List.)
S. lepidus n. sp., **S. dolosus** n. sp., **S. debilis** n. sp., supra.

S. sobrius Newm. (*Elaph.*) described erroneously from the United States is abundant at San Luis Potosi, Mex., and should not be included in our lists.

ACMÆOPS Lec.

A. viola Lec. Proc. Acad. 1860, p. 321.

This species is mentioned to note its accidental omission from among the species in the table given by Dr. LeConte (New Species, 1873, p. 209).

The form is robust and similar to *tumida*. The color violet-blue, legs and antennæ black, surface clothed with short black erect hair. The elytra are more densely punctate and the thorax rather less so than in *tumida*. In the latter species the pubescence is longer and not stiff, yellowish in color.

A. tumida is abundant in Oregon and northern California, while *viola* belongs to the central regions of the latter State.

MONILEMA Say.

The descriptions of our species of Monilema are so widely scattered, and for the most part very incomplete, that it has seemed to me proper to present a new study based on a larger aggregate of material than has been heretofore accessible.

The characters heretofore used in the separation of the species seemed very superficial and variable, and the very distinct appearance of most of the species gave good grounds for suspecting other characters of a more permanent nature.

Digitized by Google

The first character of moment is in the structure of the scape of the antennæ to which Dr. LeConte (New Species, 1873, p. 229) has already called attention, consisting of a prolongation inwards of the apex in a submucronate manner. With this we find associated a greater elongation of the first joint of the hind tarsus, while it is at the same time more slender.

The under side of the tarsal joints exhibits so much and such striking variation that it is difficult to understand how it has escaped observation. The usual vestiture of the under side of the tarsi is a yellowish spongy pubescence. This is present on the first three joints of the tarsi in the group of species of which *variolare* is the centre.

In the series of species as arranged below from *annulatum* to *forte*, the first joint of the hind tarsus is not spongy pubescent beneath, the middle of the joint being almost smooth the sides with densely placed short black hair. In many of these species the second joint has but a small patch on each side. In *subrugosum* the tip of the first joint of the hind tarsus has a very small spongy space. In *obtusum*, *spoliatum* and *forte*, the spongy pubescence gradually disappears from the joints, so that there is none whatever on *forte*.

In *variolare* and *Ulkei* it will be observed that the mesosternum between the coxæ is deeply grooved, while in the closely allied *crassum* the mesosternum is rather flat. These three species are further remarkable in having the surface clothed with an extremely fine pubescence and the surface is microscopically punctulate. The same pubescence extends on the legs.

The lateral spine of the thorax, which plays an important part in the separation of genera in various parts of the Cerambycidæ, here ceases to have any value whatever, and even within specific limits we may have quite an evident small spine or none whatever.

The annulation of the antennæ with cinereous bands cannot be depended upon as the pubescence is fugitive, and if made use of otherwise than as a purely specific character leads to confusion. The antennæ do not differ in length in the two sexes, but are slightly stouter in the males.

The sexes are distinguished by the form of the last ventral segment—broadly emarginate in the male and oval at tip in the female; the form of the legs—the femora are strongly clavate ♂, comparatively slender ♀; the pygidium is usually concealed in the male, exposed in the female. The females often have a smaller thorax than the males, this is especially observable in *subrugosum* and *armatum*.

Digitized by Google

In separating species surface sculpture must be cautiously dealt with, especially as there are often marked differences in this respect between the sexes.

I must again acknowledge my indebtedness to my friend Ulke, of Washington, for his kindness in the loan of specimens, more particularly for the types of *forte* and *obtusum*.

The species of Monilema are confined to the western and southwestern regions of our country from western Kansas to Colorado, Utah, Texas, New Mexico, Arizona, the extreme southeast of California and the Peninsula of California, the regions in fact in which there are long periods of drought, and in which Cactus is a marked feature of the vegetation. Of their food-plants nothing, I believe, is known.

The number of species known certainly to inhabit our fauna is now twelve, with possibly one more (*variolare*) to be included. In the Biologia Cent. Am., Mr. H. W. Bates enumerates ten species from the regions between our southern boundary and Panama, but it is greatly to be regretted that he has remained content with their mere enumeration as, on the whole, the Mexican species of Monilema are about as unsatisfactorily described as any Cerambycidæ with which I have had to deal.

From the characters given in the preceding papers it is proposed to divide our species in the following manner:

A.—Scape of antennæ sub-mucronate inwards at tip. First joint of hind tarsus as long or even longer than the next two and comparatively slender. Sub-genus **Monilema.**

B.—Scape of antennæ simple. First joint of hind tarsus not longer than the next two and broad.. ....Sub-genus **Collapteryx.**

Sub-genus **Monilema.**

In addition to the above characters the following may be mentioned: The first and second joints of the hind tarsi are glabrous at middle, the second with a narrow spongy pubescent space each side, the third entirely spongy pubescent. The anterior and middle tarsi have the first three joints spongy pubescent beneath, the pubescence divided by a narrow line.

The two species belonging here are separated in the following manner:

Thorax quadrate or a little wider than long, the sides with a feeble tubercle. Elytra sparsely and regularly punctured at basal half, wrinkled at apex, the sides arcuately deflexed ....**annulatum** Say.

Thorax cylindrical, usually longer than wide, without trace of spine or tubercle. Elytra not conspicuously punctate, usually smooth but feebly shining, sometimes with deep longitudinal wrinkles, the sides abruptly deflexed and obtusely margined near the base.....**appressum** Lec.

Digitized by Google

Sub-genus **Collapteryx.**

The vestiture of the tarsi is variable, and affords the means of dividing the species into smaller groups. No other characters than those given above will apply to all the species.

The name here used has been proposed by Newman (Ent. Mag. v, p. 397) for a Mexican species, and should it be considered advisable to divide Monilema into two genera this name should be revived, the division Omoscylon proposed by Mr. James Thomson being founded on evanescent characters.

From the varying tarsal and other structures the species may be separated in the following manner:

Scape of antennæ and legs smooth.....2.
Three basal joints of antennæ and legs coarsely punctured.....7.
2.—First joint of hind tarsus without any spongy pubescence beneath.....3.
First joint of hind tarsus spongy pubescent over almost the entire surface....8.
3.—Second joint of hind tarsus with a small spongy pubescent space each side..4.
Second joint of hind tarsus without trace of spongy pubescence.....6.
4.—Thoracic spines long and acute, directed strongly upward and backward. Elytra with slightly depressed disc, the sides abruptly declivous, obtusely margined near the humeri. Thorax with very few punctures.
gigas Lec.
Thoracic spines small or tuberculiform, sometimes barely perceptible.....5.
5.—Thorax with numerous coarse and fine punctures intermixed over the entire surface, the coarser punctures more numerous near the base and apex.
semipunctatum Lec.
Thorax almost entirely smooth, a few punctures, at most, along the base and apex.
Elytra with extremely few punctures, these placed at the middle of the side and under the humeri.....**lævigatum** Bld.
Elytra with numerous coarse punctures extending two-thirds to apex, the deflexed portion punctured nearly to the apex.....**armatum** Lec.
6.—Anterior tarsi with the first three joints spongy pubescent beneath. Thorax coarsely punctured with a feeble lateral tubercle.....**obtusum** Lec.
Anterior tarsi with the third joint bearing a small spongy pubescent space each side.
Thorax punctured at apex and base, the lateral spine small but acute.
spoliatum n. sp.
Tarsi with scarcely a trace of spongy pubescence on any of the joints. Thorax coarsely punctured, the lateral spine moderately long and acute.
forte Lec.
7.—Thorax sparsely punctured, without trace of lateral tubercle, elytra coarsely punctured. Hind tarsi with a small spongy pubescent spot at the apex of the first joint, the second and third joints entirely spongy pubescent.
subrugosum Bld.

Digitized by Google

8.—Intercoxal process of mesosternum rather deeply grooved in its entire length. Elytra variegated with a net-work of very fine pubescence in at least one sex. Elytra distinctly wider at base than the thorax, the humeri slightly prominent. Thorax with very few punctures and these placed along the base and apex. Pubescence of elytra white.....**Ulkei** n. sp.

Elytra not wider at base than the thorax, the humeri rounded. Thorax with numerous punctures on the disc. Pubescence of elytra fulvous. **variolare** Thoms.

Intercoxal process of mesosternum nearly flat not grooved. Elytra not pubescent.....**crassum** Lec.

M. annulatum Say.—Black, moderately shining. Front smooth. Scape of antennæ smooth, joints 3–6 annulate with white at basal half. Thorax quadrate, slightly narrower in front, wider than long, sides usually slightly arcuate with a feeble tubercle slightly behind the middle. surface nearly smooth, a few punctures along the basal margin only. Elytra elongate oval, about twice as long as wide, narrower at apex than base, sides arcuately declivous, surface moderately coarsely and regularly punctured at basal half, the apex slightly wrinkled. in well preserved specimens a stripe of extremely fine plumbeous pubescence extending from the humeri to the apex. Body beneath smooth and shining, femora smooth. Length .48–.72 inch; 12–18 mm.

The anterior and middle tarsi have the first three joints spongy pubescent beneath divided by a narrow line. The first joint of the hind tarsus is without spongy pubescence, the second and third joints spongy pubescent with a wider median division.

This species exhibits very little noteworthy variation. A small specimen in Mr. Ulke's cabinet has very few punctures at the base of the elytra.

Occurs in Colorado, eastern New Mexico and Northern Texas.

M. appressum Lec.—Black, feebly shining. Front with few small punctures. Scape of antennæ nearly smooth, joints 3–6 annulate at base. Thorax subcylindrical, longer than wide, slightly narrower in front, sides not tuberculate, surface nearly smooth. a few inconspicuous punctures along the base. Elytra elongate oval, a little more than twice as long as wide, apex scarcely narrower, sides abruptly declivous, obtusely margined near the base, surface with few inconspicuous punctures at basal third, the surface either smooth, vaguely, or even deeply longitudinally wrinkled. Body beneath smooth, legs smooth. Length .56–1.16 inch; 14–29 mm.

The tarsi beneath are similar to those of *annulatum* but the median division is sometimes indistinct. The second joint of the hind tarsi has a smaller pubescent space.

This species varies especially in the elytra. In some the disc is rather flat and the edge of the declivity distinctly marked, in others nearly as convex as in *annulatum*. The surface may be quite smooth with feeble trace of wrinkles or may be deeply longitudinally wrinkled, with all intermediate forms.

Digitized by Google

The smoother specimens are from Arizona, the deeply wrinkled from New Mexico.

M. gigas Lec.—Black, shining. Front sparsely finely punctate. Scape of antennæ smooth, the fourth joint alone broadly annulate. Thorax as wide as long, slightly narrower in front, the sides with a long acute spine directed upwards and slightly backward, surface with few punctures, more numerous along the basal margin. Elytra oval, somewhat narrower behind, humeri oblique, disc slightly flattened, sides obtusely margined and abruptly declivous, the surface with coarse punctures extending two-thirds to apex. Body beneath smooth, shining, femora smooth. Length 1.20–1.36 inch; 30–34 mm.

The first three joints of the anterior and middle tarsi are spongy pubescent beneath with narrow median line. The first joint of the hind tarsus is not pubescent, the second with a small space on each side spongy pubescent, the third entirely so.

The specimen before me, the type of the description of Dr. LeConte, has the coarse punctures of the elytra rather regularly disposed over the entire surface two-thirds to apex and on the sides to the same extent. Two other specimens have the middle of the disc of the elytra almost entirely free of punctures, these being placed near the side and on the deflexed portion. In both forms the side of the thorax below the spine is coarsely punctured and the median line of the disc slightly impressed posteriorly.

Occurs in Arizona.

M. semipunctatum Lec.—Form rather elongate, black, shining. Front punctured with coarse and fine punctures intermixed. Scape of antennæ sparsely punctate, the other joints not annulate. Thorax a little wider than long, sides slightly arcuate with a small subacute spine, the surface punctured over the entire disc with coarse and fine punctures intermixed, the sides below the spine coarsely punctured. Elytra oval, more than twice as long as wide, slightly narrower posteriorly, sides abruptly deflexed, an obtuse margin near the humeri, the surface sparsely punctured, the punctures gradually finer and these wanting on the apical third, the sides with more numerous punctures near the base, then sparser two-thirds to apex. Body beneath sparsely finely punctate, femora punctate. Length .74–1.00 inch; 18.5–25 mm.

The tarsi beneath are as in *gigas*. The only variation observed is that usual in all the species, consisting of a greater or less distinctness of the punctuation. This species and *subrugosum* are the only ones in which the scape and the femora are observed to be punctate, this is however much less distinct here than in that species.

Occurs at Cape San Lucas, Lower California.

M. lævigatum Bld.—Moderately elongate, black and very shining. Front sparsely punctate each side. Scape of antennæ smooth, joints 3–6 indistinctly annulate. Thorax slightly wider than long, sides feebly arcuate, a small acute

Digitized by Google

tubercle behind the middle, disc smooth, a few coarse punctures along the base. Elytra elongate oval, nearly twice as long as wide, sides abruptly deflexed, surface smooth, a few coarse punctures near the side and beneath the humeri. Body beneath smooth, impunctate, femora smooth. Length .84–.88 inch; 21–22 mm.

The tarsal characters are as in *gigas*. In the three specimens before me I observe no noteworthy variation. A specimen loaned me by Mr. Ulke has red thorax and femora, it is merely immature.

Occurs in New Mexico, near Santa Fe.

M. armatum Lec.—Moderately elongate, shining. Front sparsely punctate each side. Scape of antennæ smooth, joints 3–6 indistinctly annulate. Thorax a little wider than long, sides slightly arcuate and with an acute, post-median, short spine, surface smooth, a few punctures along the base and under the spine. Elytra elongate oval, nearly twice as long as wide, sides abruptly declivous, either obtusely margined ♂ or not ♀, the surface with coarse punctures sparsely and irregularly placed, extending two-thirds to apex, the deflexed portion more coarsely and closely punctured at base, more sparse posteriorly and reaching nearly to apex. Body beneath and femora smooth. Length .66–1.00 inch; 16.5–25 mm.

The tarsal characters are as in *gigas*. The males have the elytra more abruptly declivous than the female and the punctures of the surface are coarser and more numerous.

Occurs in Colorado and Texas.

M. obtusum Lec.—Form moderately elongate, black shining. Front sparsely punctate each side. Scape of antennæ smooth, joints 3–6 annulate with cinereous at base. Thorax slightly longer than wide without trace of lateral tubercle or spine, the surface coarsely not closely punctate, the deflexed sides smoother. Elytra oval, not twice as long as wide, the sides rather abruptly deflexed, surface rather sparsely punctate two-thirds to apex, the punctures not large, but submuricate near the humeri and at the base of the deflexed portion. Body beneath and femora smooth. Length .75 inch; 19 mm.

Anterior tarsi with the first three joints spongy pubescent beneath; middle tarsi with the first two joints having a small spongy pubescent space each side, the third joint spongy pubescent, the lobes well separated; hind tarsi with a small pubescent space on each side of the third joint alone.

Of this species I have seen the type from Mr. Ulke's cabinet, collected in Utah.

M. spoliatum n. sp.—Form moderately elongate, black, shining. Front sparsely punctate each side. Scape of antennæ smooth, joints 3–6 indistinctly annulate. Thorax wider than long, slightly narrower at base than apex, sides slightly arcuate in front of the small, acute lateral spine and nearly straight behind it, disc sparsely indistinctly punctate, a few coarse punctures at apex and base, the deflexed portion coarsely punctured in front. Elytra elongate oval, nearly twice as long as wide, sides abruptly deflexed, surface smooth, a few small

Digitized by Google

submuricate punctures near the humeri extending obsoletely half way to apex, the deflexed portion more distinctly punctured. Body beneath and femora smooth. Length .92 inch; 23 mm.

Anterior and middle tarsi with the third joint alone bearing a small space of spongy pubescence on each lobe; hind tarsi similar.

This species might be mistaken for *laevigatum* but the punctuation and the tarsal characters will separate it. The thoracic spine is also larger.

One specimen ♀ from Peninsula of California near the northern boundary.

M. forte Lec.—Form moderately elongate, black, shining. Front punctate. Scape of antennæ nearly smooth, joints 3-7 annulate at base. Thorax a little wider than long, base slightly narrower than apex, sides in front of the acute lateral spine slightly arcuate, posteriorly nearly straight, surface of disc rather irregular, median line distinct posteriorly, the surface coarsely and deeply punctured at the basal half and more narrowly along the apex, the deflexed sides coarsely punctured. Elytra elongate oval, nearly twice as long as wide, sides abruptly declivous, surface sparsely punctate two-thirds to apex and near the humeri more coarsely submuricately punctate, the deflexed sides numerously punctate near the base. Body beneath and femora smooth. Length 1.20 inch: 30 mm.

The anterior and middle tarsi have an extremely small spot of spongy pubescence on the third joint only; hind tarsi without spongy pubescence.

In this species the thoracic spine is more developed than in any except *gigas*.

One specimen ♂ from the cabinet of Mr. Ulke.

M. subrugosum Bld.—Form moderately elongate, black, shining. Front punctate. Antennæ with first four joints rather coarsely punctate, the fourth joint feebly annulate. Thorax as long as wide, sides arcuate, without trace of tubercle or spine, surface sparsely punctate, more coarsely along the base, apex and deflexed portion. Elytra elongate oval, nearly twice as long as wide, sides abruptly deflexed and obtusely margined ♂, more arcuately deflexed ♀, surface with numerous coarse and deep punctures which extend three-fourths to apex, the deflexed portion with more numerous and deeper punctures. Abdomen coarsely punctured at middle, legs rather roughly punctate. Length .78-1.08 inch; 19.5-27 mm.

The first three joints of the anterior and middle tarsi are spongy pubescent over the entire surface; the first joint of the hind tarsus is spongy only near the tip, the second and third over the entire surface.

The vestiture of the tarsi is of a grade intermediate between the first six species and those which are to follow. The general rough sculpture of the surface, the absence of thoracic spine and the tarsal vestiture will distinguish this species.

Peninsula of California, Cape San Lucas.

Digitized by Google

M. Ulkei n. sp.—Form moderately robust, black, feebly shining, thorax and elytra ♂ variegated with a network of fine white pubescence, in the female glabrous. Front sparsely punctate with extremely fine brownish pubescence, the vertex near the border of the eyes with white pubescence. Scape of antennæ smooth, joints 3–4 narrowly annulate at base. Thorax wider than long, narrower at apex, sides with a short but obtuse spine, in front of which the sides are oblique and behind parallel, disc moderately convex, a slight depression above the spine, with few scattered punctures and others more numerous in a transverse line in front of base, surface clothed with extremely fine brown pubescence with a network of white near the sides and base. Elytra oval, narrower posteriorly, the base truncate wider than the base of the thorax, the humeri distinct, sides abruptly declivous, disc feebly convex with numerous coarse and deep punctures not closely placed, extending nearly to the apex and a little finer posteriorly, the sutural region not punctate and broader posteriorly, the deflexed portion of the elytra more coarsely and closely punctured than the disc. Body beneath almost impunctate, clothed with an almost invisible brown pubescence with small patches of white, the bases of the femora and the coxæ conspicuously white. Mesosternum deeply grooved between the coxæ. Femora smooth. Length .76–.86 inch; 19–21.5 mm.

The first three joints of all the tarsi are densely spongy pubescent beneath.

The females have the elytra much less punctured, and in one specimen before me slightly wrinkled, the surface above without pubescence.

Superficially this species resembles *variolare*, from which it differs as follows: the surface is less punctured and the pubescence white, not fulvous, the thoracic spine more distinct; the femora smooth, in *variolare* coarsely punctate; the humeri more prominent and the base of the elytra broader.

Feeling quite confident that this species differs from any that are described with similar ornamentation, I dedicate it to my friend Henry Ulke, whose name I have already had occasion to mention.

Occurs in Dimmit County, Texas; given me by Mr. F. G. Schaupp.

M. variolare Thoms.—Form moderately elongate, black, shining. Front sparsely punctate at the sides with dark brown pubescence above, vertex with fulvous pubescence between the eyes. Antennæ not distinctly annulate, the scape and third joint sparsely punctate. Thorax wider than long, obtusely tuberculate at the sides, apex slightly narrower than base, sides arcuate, disc moderately convex sparsely coarsely punctate, more coarsely at the base and deflexed sides, surface clothed with extremely fine brown pubescence with a network of yellowish white or fulvous. Elytra oval, narrower posteriorly, longer in the female, the base not or very little wider than the thorax, humeri very obtuse, sides abruptly deflexed, disc slightly flattened with numerous coarse punctures not closely placed which become finer posteriorly and attain the apex in the ♂, the ♀ smooth at apical third, the deflexed portion more closely and coarsely punctured, surface clothed with extremely fine brown pubescence with an intricate network of fulvous pubescence, often entirely absent in ♀. Body beneath sparsely punctate,

Digitized by Google

clothed with fine yellowish white pubescence in patches, forming bands on the abdomen. Mesosternum deeply sulcate between the coxæ. Legs coarsely and deeply punctured. Length .70–.88 inch; 18–22 mm.

The first three joints of all the tarsi are spongy pubescent beneath.

The females are usually less punctured than the males and without the network of pubescence above. This, however, is not constant, as a female in my cabinet has the network as in the male but less pronounced.

The only specimens I have seen of this species were collected at San Luis Potosi in Mexico. I have no knowledge of its having been collected within our limits except that the specimens in Dr. LeConte's cabinet labeled *albopictum* were said to be *variolare* by Mr. James Thomson when he examined them during a visit in 1876. These latter specimens are not now before me but I am inclined to think the identification erroneous and that they are the *Ulkei* above described.

The species described as having reticulated lines of pubescence are *variolare* Thoms., *albopictum* Wht., *infamiæ* Thoms., *mortuale* Thoms. and *sinistrum* Thoms. The first of these is already amply compared with the preceding species. Of *albopictum* Thomson writes (Physis, i, p. 80) that it is the female which is reticulate with white and not the male. *M. infamiæ* has the elytra subconfluently alveolate punctate at base. *M. mortuale* has the pubescence yellow and the dorsum of the elytra smooth, and the tarsi nigro-pilose beneath. *M. sinistrum* has the dorsum smooth and the pubescence otherwise arranged than in the other species.

M. crassum Lec.—Form short, robust, black, feebly shining, surface clothed with an extremely fine, black, velvety pubescence. Front sparsely punctate. Scape of antennæ smooth, joints 3–5 distinctly annulate at base. Thorax wider than long, slightly narrower at apex, sides with a short acute spine behind the middle, disc moderately convex, a few punctures sparsely scattered, coarser and deeper near the base and on the deflexed sides. Elytra rather broadly oval, scarcely narrower posteriorly, humeri broadly rounded, sides abruptly deflexed, surface sparsely and rather finely punctate at basal half, and vaguely wrinkled, the deflexed portion more distinctly punctate. Mesosternum not sulcate. Body beneath sparsely finely punctate, the coxæ conspicously brown pubescent. Femora smooth. Length .74–.90 inch; 18.5–22.5 mm.

The first three joints of the tarsi are spongy pubescent beneath, the first joint of the hind tarsus sulcate.

This species is the most robust form in our fauna.

Collected in southwestern Texas.

Digitized by Google

MONILEMA Say

M. annulatum Say, Journ. Acad. 1824, p. 404; Lec. Journ. Acad. 1852, ii, p. 167; Lec. Gen. Atl. pl. 97, fig. 2.
M. appressum Lec. loc. cit. p. 168; Col. Kans. 1859, p. 21, pl. 2, fig. 17.
M. gigas Lec., New Species, 1873, p. 230.
M. semipunctatum Lec., Journ. Acad. 1852, ii, p. 167.
M. laevigatum Bland, Proc. Ent. Soc. Phil. i, p. 267.
M. armatum Lec., Proc. Acad. 1853, p. 234; Arcana Naturæ, p. 128, pl. 13, fig. 2.
M. obtusum Lec., New Species, 1873, p. 230.
M. spoliatum Horn, supra.
M. forte Lec., New Species, 1873, p. 230.
M. subrugosum Bland, loc. cit. p. 268.
M. Ulkei Horn, supra.
M. variolare Thoms., Physis. i, p. 77.
M. crassum Lec., Proc. Acad. 1853, p. 234.

MONOHAMMUS Serv.

In separating the species of this genus by means of the presence or absence of sutural prolongation of the elytra care should be taken that the male alone is relied upon, the females being variable. In well developed males of *titillator* alone, do we find a true sutural spine. In *maculosus* there is never a spine but the sutural angle is always prolonged slightly, while in *scutellatus* the elytra are always obtuse at tip in both sexes. The well known *confusor* has the apices obtuse, the sutural angle often rounded. In *marmorator* the apices of the elytra are obliquely prolonged and acute.

In all the species the male antennæ are quite roughly punctured and without pubescence, the female antennæ very much smoother and clothed with a fine cinereous pubescence on the basal half of each joint from the third except in *confusor*, in which the whole of each joint is pubescent.

The character made use of by Dr. LeConte for the separation of *oregonensis* and *scutellatus*—the denuded medial stripe of the scutellum in the first—is evanescent.

From the foregoing remarks it will be inferred that the number of specific names in our lists is greater than the number of true species.

From the evidences of my series the species may be separated in the following manner:

A.—Tips of elytra rounded, the sutural angle acute or spiniform, more especially in the male.

General surface color brownish, the elytra irregularly mottled with patches of brown and gray or white pubescence.....**titillator.**

General surface color piceous or black, more or less bronzed, elytral ornamentation as above, the surface sculpture coarser and deeper.

maculosus.

Digitized by Google

B.—Tips of elytra rounded, the sutural angle not prolonged, usually very obtuse. Surface color black, distinctly bronzed, the elytra with very little or no patches of white and brown pubescence; antennæ annulate in the female. **scutellatus.**

Surface color brown, elytra sparsely mottled with small patches of gray and brown pubescence; antennæ of female uniformly pubescent. **confusor.**

C.—Tips of elytra obliquely prolonged and acute. Elytra brownish, surface feebly punctured, clothed with ochreous, white and brownish patches intermixed ..... **marmorator.**

M. titillator Fab.

The sculpture of the thorax is variable, either very sparsely punctate or densely and closely punctate. Well developed males have the suture prolonged in a distinct spine, sometimes, however, the angle is merely acute. In the female the angle is usually acute, although sometimes nearly as obtuse as in *scutellatus*. The antennæ of the male are often very long, equalling four times the length of the body; in the female the antennæ are at most one and a half times the length of the body. Length .50–1.25 inch; 13–32 mm.

The species described as *minor* Lec., is merely a small form, it is the *carolinensis* Oliv.

Occurs from Canada to Washington Territory and south to Florida.

M. maculosus Hald.

In mature specimens the surface color is quite black and slightly bronzed. The elytra are more coarsely and deeply punctured than in *titillator*. The sutural angles of the elytra are acute but never spiniform, and in the female very often rounded. The male antennæ are rarely more than twice the length of the body and in the female very little longer than the body. Length .66–.1.06 inch; 16.5–27 mm.

Specimens less mature resemble the darker varieties of *titillator*, while those more denuded might be mistaken for *scutellatus*. Specimens occur with the scutellum uniformly white or with a median denuded line.

Occurs from Montana to Washington Terr. and California, southward through Colorado to Arizona.

M. scutellatus Say.

Color quite black with a slight surface bronzing, the elytra either entirely nude or with small scattered patches of whitish pubescence, rarely with a slight dusting of brownish pubescence. Scutellum conspicuously white with often a partial or complete denuded median line. The sutural angle in both sexes is obtuse or even rounded. The sculpture of the elytra is variable, the males have coarser punctuation which

Digitized by Google

extends to the tips of the elytra. The females often have the elytra less punctured posteriorly, although these two forms of sculpture are not constant in either sex. The male antennæ are twice as long as the body, the female one and a quarter times. Length .64–1.24 inch; 16–31 mm.

With this species I have united *oregonensis* Lec. the characters separating them being evanescent.

Occurs from Maine westward to Oregon and northward to the Hudson's Bay region.

M. confusor Kby.

General surface color brownish, uniformly clothed with a fine gray pubescence with small patches of brown and white sparsely placed. Apices of elytra in both sexes rounded, the sutural angle obtuse. The elytral sculpture is feebler than in the preceding species, and the punctures become rapidly finer toward the apex. The male antennæ are often more than twice, in the female very little longer than the body, the surface not pubescent in the male, uniformly gray pubescent in the female; 1.10–1.24 inch; 28–31 mm.

There seems to be less variation in the length of the specimens of this species than in those which precede.

Occurs in Canada, New England and Middle States.

M. marmorator Kirby.

General color dark brown, the surface moderately shining, the elytra clothed with patches of ochreous, yellowish white and brown pubescence. Apices of elytra obliquely prolonged and acute in both sexes. Surface of elytra feebly sculptured, the punctures slightly rough at base and becoming rapidly finer near the apex. Antennæ of female one and a quarter times the length of the body, distinctly annulate from the third joint. Length 1.00 inch; 25 mm.

This species appears to be extremely rare, and I have not been able to obtain more than two specimens, both females.

There is no doubt in my mind that the species described by Kirby is the same as that known by Randall's more recent name *marmoratus*, and the Kirby name being the older should be restored.

Occurs in Maine and Michigan.

MONOHAMMUS Serv.

M. titillator Fab. Syst. Ent. p. 172; Oliv. Ent. iv, 67, p. 85, pl. 15, fig. 109; Lec. Journ. Acad. ii, 2, p. 148.

carolinensis Oliv. Enc. Meth. vii, p. 643; Ent. loc. cit. pl. 12, fig. 88.

dentator Fab. Ent. Syst. i, 2, p. 278; Beauv. Ins. p. 244, pl. 36, fig. 5.

minor Lec. New Species, 1873, p. 231.

Digitized by Google

M. maculosus Hald. Trans. Am. Phil. Soc. x, p. 51.
mutator Lec. Agass. Lake Super. p. 235.
marmoratus‡ Lec. Journ. Acad. 1852, ii, p. 148.
clamator Lec. loc. cit. p. 149.

M. scutellatus Say, Long's Exped. ii, 1824, p. 289; Lec. loc. cit. 148.
resutor Kby. Faun. Bor. Am. iv, p. 167.
oregonensis Lec. New Species, 1873, 231.

M. confusor Kby. Faun. Bor. Am. iv, p. 168; Lec. Journ. Acad. 1852, ii, p. 148.

M. marmorator Kby. Faun. Bor. Am. iv, p. 169.
marmoratus Rand. Bost. Journ. ii, p. 42.
fautor Lec. Journ. Acad. 1852, ii, p. 149.
acutus Lacord. Gen. Col. ix, p. 316 note.

GOES Lec.

This species of this genus are but few in number and may be separated in the following manner:

Surface color of body brownish; antennæ of male at most one and a quarter times the length of the body.....2.
Surface color of body black, shining; antennæ of male twice as long as the body, of the female as long as in the preceding males.....5.
2.—Elytra with conspicuous denuded fascia one-third from apex.....3.
Elytra without conspicuous denuded fascia.....4.
3.—Pubescence of surface white.....**tigrina.**
Pubescence ochreous or luteous, the basal region of the elytra darker, less pubescent.....**pulchra.**
Pubescence marmorate, whitish and ochreous, the apical region darker ochreous.....**debilis.**
4.—Pubescence luteous or pale brown, inconspicuously mottled with paler spots. **tesselata.**
Pubescence cinereous or almost white, uniform, sometimes with a faint trace of darker fascia.....**pulverulenta.**
5.—Elytra coarsely punctured, pubescence whitish, a small conspicuous black spot on each elytron one-third from apex.....**oculata.**

Bibliography.

G. tigrina De Geer, Ins. v, 113, pl. 14, fig. 6; Lec. Journ. Acad. ii, p. 150.
tomentosus Ziegler, Proc. Acad. ii, p. 47; Hald. Journ. Am. Phil. Soc. x, p. 51.
G. pulchra Hald. loc. cit. p. 52; Lec. loc. cit. p. 150.
G. debilis Lec. loc. cit. p. 150.
G. tesselata Hald. loc. cit. p. 51; Lec. loc. cit. p. 150.
G. pulverulenta Hald. loc. cit. p. 51; Lec. loc. cit. p. 150.
G. oculata Lec. Proc. Acad. 1862, p. 40.

DORCASCHEMA Hald.

This genus contains but three species as far as known separable in the following manner:

Digitized by Google

Thorax truly cylindrical, longer than wide; general surface color less the pubescence, brown.

Thorax transversely wrinkled, the punctuation indistinct; elytra densely cinereo-pubescent with small rounded denuded spots more abundant at the sides and a larger denuded spot behind the middle..... ..... . **Wildii.**

Thorax not wrinkled, punctuation distinct; pubescence of elytra rather sparse, marmorate with ochreous spots, a denuded interrupted band behind the middle..... .... **alternatum.**

Thorax slightly tubularly narrowed behind the middle, nearly as wide as long: color black. Disc of thorax finely rugose..... ..... **nigrum.**

Bibliography.

D. Wildii Uhler, Proc. Acad. vii, p. 217.

D. alternatum Say, Journ. Acad. iii. p. 405; Hald. Trans. Am. Phil. Soc. x, p. 54; Lec. Journ. Acad. 2, ii, p. 147.

D. nigrum Say, Journ. Acad. v, p. 272; Hald. loc. cit.; Lec. loc. cit.

The first two species live on Mulberry, the third on Hickory.

LYPSIMENA Lec.

L. californica n. sp.—Brown, feebly shining, moderately elongate, cylindrical, slightly depressed. Thorax wider than long, moderately convex, sparsely coarsely punctate, sparsely cinereo-pubescent. Elytra wider at base than the thorax, punctuation coarse and moderately close near the base, much more distant near the apex, surface sparsely cinereo-pubescent forming an indistinct design of longitudinal interrupted and somewhat angulated lines. Body beneath coarsely sparsely punctate, moderately densely cinereo-pubescent. Length .36 inch; 9 mm.

One male specimen, the antennæ one-third longer than the body. It resembles *fuscata*, but differs in the form and punctuation of the thorax, that of *fuscata* being square, densely and coarsely punctured.

One male, San Diego, California.

ONCIDERES Serv.

The species known to inhabit our fauna may be separated in the following manner:

Elytra with elevated tubercles, at last near the base; thorax with distinct lateral spine.

Thorax with a transverse, glabrous, elevated space; surface densely brownish pubescent, elytra with denuded spots, tuberculiform at base, flat posteriorly; .75 inch; 19 mm..... **pustulata** Lec.

Thorax with three callosities in a transverse row; elytra with gray pubescence, a broad ante-median band paler, and numerous spots of brownish yellow arranged in four irregular rows; .68 inch; 17 mm..... **putator** Thoms.

Elytra simply punctate, without tubercles; thorax without discal callosities.

Thorax with distinct lateral spine.

Clothed with grayish pubescence, the basal fifth and apical third of the elytra darker, the elytra with numerous ochreous spots as in *putator*; .60 inch; 15 mm..... ..... **texana** n. sp.

Digitized by Google

Thorax without lateral spine or tubercle.
Clothed with pubescence variable in color from cinereous to ochreous, the median paler elytral band not very distinct, the spots indistinct; .56–.66 inch; 14–16.5 mm..... ...**cingulata** Say.

O. pustulata Lec. Proc. Acad. 1854, p. 82.

The only specimen I have ever seen is the type in cab. LeConte and not now before me. It is evidently closely allied to *albo-marginata* Thoms.

Occurs at Laredo, Texas.

O. putator Thoms. Physis. ii, p. 81.

The specimens before me are all smaller than the measurements given by Thomson but the description otherwise corresponds so closely that there can be very little doubt of their identity.

Occurs in Arizona, also in Mexico.

O. texana n. sp.—Moderately elongate and convex, brownish, moderately densely clothed with pale gray pubescence, less dense at basal fifth and apical third of elytra. Thorax wider than long, distinctly narrowed behind the small acute lateral tubercle, surface densely finely punctate with a few conspicuous coarse punctures sparsely placed, without denuded dorsal callosities. Elytra punctate, the punctures very coarse and close at base, sparser and finer toward the apex, surface cinereo-pubescent, with reddish yellow spots of denser pubescence arranged in four irregular series. Body beneath densely cinereo-pubescent. Legs sparsely pubescent. Length .60 inch; 15 mm.

This species might readily be mistaken for *cingulata*, but the very distinct lateral spine of the thorax and the more evident darker elytral spots will readily distinguish it. There are no distinct thoracic callosities, but the median line may be abraded. From Mr. Bates' description this species is also allied to *scitula* (Biologia, v, p. 126), but this has dorsal callosities and the thorax not narrowed behind the lateral spine.

Two specimens, Texas.

O. cingulata Say, Journ. Acad. v, p. 272; Lec. Journ. Acad. 2, ii, p. 165.

Variable in the color of its pubescence, and never with the median band of the elytra as distinct as in the two preceding species. The thorax has no dorsal callosities, and the lateral spine is entirely wanting or reduced to a very faint tubercle. In form the thorax may be truly cylindrical (in some females) or quite as much narrowed at base as in *putator* or *texana*.

Occurs from the Middle States to Texas.

Digitized by Google

EUPOGONIUS Lec.

Four species are known to inhabit our territory.

Lateral spine of thorax acute, well marked ..... 2.
Lateral spine of thorax small, obtuse ..... 3.
2.—Elytra pale castaneous, the punctuation not strong, almost obliterated near the apex, the pubescence cinereous or yellowish forming reticulations more or less transverse ..... **tomentosus.**
Elytra piceous, the punctuation coarse gradually finer but not obliterated at tip, the pubescence luteous arranged in irregular small patches.. **vestitus.**
3.—Elytra nearly black, the punctuation rather coarse, finer at apex but distinct, the pubescence cinereous, fine and very evenly disposed; thorax sparsely evenly pubescent ..... **pubescens.**
Elytra black, coarsely punctured even to the apex, pubescence black and inconspicuous; thorax with a lateral broad line of yellowish pubescence. **subarmatus.**

In addition to the recumbent pubescence mentioned in the above table the entire body, antennæ and legs have short erect hair. *E. subarmatus* has great resemblance in aspect to our species of Amphionycha.

Bibliography.

E. tomentosus Hald. Trans. Am. Phil. Soc. x, p. 50; Lec. Journ. Acad. 2, ii, p. 159.

E. vestitus Say, Journ. Acad. v, p. 273; Hald. loc. cit.; Lec. loc. cit.
pauper Lec. loc. cit.

E. pubescens Lec. New Species, 1873, p. 236.

E. subarmatus Lec. Col. Kansas, p. 92; Proc. Acad. 1861, p. 354, note.

DYSPHAGA Lec.

D. bicolor n. sp.—Pale reddish yellow, elytra, antennæ and tarsi piceous. Head coarsely and rather closely punctate. Thorax as wide as long, sides slightly arcuate, disc moderately coarsely punctate, the punctures indistinct, shallow. Scutellum pale. Elytra a little wider at base than the thorax, extending to the middle of the abdomen, dehiscent, gradually narrower to the apex which is very obtuse, disc of each indistinctly bicostate the surface punctate-scabrous, but smoother near the base. Length .30 inch; 7.5 mm.

In the specimen before me the antennæ are about one and a third times the length of the entire body and the last ventral segment deeply incised, the incisure fimbriate with short hairs. The specimens with the last ventral segment so found, or as Dr. LeConte expresses it "triangularly excavated," were considered by him to be females, and probably correctly, although the specimens of all the species known to me do not exceed five, three in the cabinet of LeConte and two in mine, and give but little ground for the expression of a positive opinion.

One specimen from Texas given me by Mr. F. G. Schaupp.

Digitized by Google

The species at present known are three, and may be thus separated:

Body in great part piceous or black.
Thorax vaguely coarsely punctate..... .....**tenuipes.**
Thorax smooth.....**laevis.**
Reddish yellow, antennæ, elytra and tarsi black..... ....**bicolor.**

D. tenuipes Hald. Proc. Acad. iii, p. 126; Hald. Proc. Am. Philos. Soc. iv, p. 374; Lec. Journ. Acad. 1852, ii, p. 143.
ventralis ♀ Hald. Proc. Am. Philos. Soc. iv, p. 374.
D. laevis Lec. New Species, 1873, p. 240.
D. bicolor n. sp. supra.

The species of this genus are all extremely rare, those taken in Pennsylvania have been reared from the terminal twigs of hickory which fall from the trees during the storms of winter, they probably appear in May or June.

The information on which the following remarks are based was received too late to enable me to insert it in its proper place near the beginning of the paper:

PLAGITHMYSUS Mots.

This name has been used in the Classification in place of Neoclytus. The scope originally accepted for the latter genus by Dr. LeConte in the Classification of 1873 included Plagithmysus as defined by Motschulsky, the latter name being the older was therefore used.

It is, however, the opinion of Dr. Sharp and others that Plagithmysus is worthy of being retained separate from Neoclytus, and he has, in fact, re-described the former under the name Clytarlus (Trans. Ent. Soc. Lond. 1878, p. 137), indicating in all ten species from the Sandwich Islands (Trans. Royal Dublin Soc. 1885, p. 261) one of which (*C. Blackburni* Shp.) seems to be the same as *P. pulverulentus* Motsch. It is probable that Motschulsky's specimen, obtained from Eschscholtz, came from the islands and not from California. There is, however, one specimen in Mr. Sallé's cabinet which came from California. The name Neoclytus should remain for our species, and from present appearances *Plagithmysus pulverulentus* should be dropped from our lists as an accidental introduction.

Rhopalopachys morosus Chev. = Neoclytus irroratus *Lec.*

Digitized by Google

Synopsis of the THROSCIDÆ of the United States.

BY GEORGE H. HORN, M. D.

The small series of insects contained in this family seems to have escaped attention in our fauna with the exception of the description of a few new species by Dr. LeConte.

Three genera are known in our fauna which may be separated in the following manner:

Antennæ with the last three joints abruptly larger; metasternum obliquely grooved for the reception of the middle tarsi.....**Throscus.**
Antennæ fusiform; metasternum and first three segments of abdomen obliquely grooved for the reception of the middle and posterior tarsi.....**Pactopus.**
Antennæ serrate from the third joint; tarsi free, not received in grooves.
Drapetes.

Throscus is represented on both sides of the continent, Pactopus in the Pacific and Drapetes in the Atlantic region.

THROSCUS Latr.

The generic characters have so often been given that it is hardly necessary to dwell further on them. There are, however, some differences of structure within generic limits to which it may be useful to call especial attention as they supply characters of great use in grouping and dividing the species.

In his admirable essay (Essai monographique sur la famille des Throscides, Paris, 1859) Bonvouloir indicates important modifications of the eyes, which may be grouped in three series. In the first the eyes are oval in form and entire, the second is that in which the front of the eye is broadly triangularly emarginate, while in the third an oblique narrow depression very nearly divides the eye into two nearly equal portions. These three forms give a very natural primary grouping of the species.

The second character of moment is the mode of striation of the prosternum. In nearly all the species the striæ are entire, extending from the point of the prosternum forward to the anterior margin, and in most cases exactly parallel, but in a few divergent. There are, however, species in which the striæ are abbreviated, in which case the middle of the prosternum in front is more distinctly punctate.

Digitized by Google

There seems to be no mention of the carination of the hind angles of the thorax in any species yet described, but in several of our species this character will be observed, and in *pugnax* may be seen in its best development. The carina is very near the lateral margin, and from the pubescent covering may have escaped observation in foreign species.

Two of our species have the front strongly carinate, both belonging to the series with triangularly emarginate eyes, and which, from both characters, are related to the *dermestoides* of Europe. But one species of the series with entire eyes has the front with short carinæ, while in all those in our fauna with the obliquely impressed eyes the carinæ although obtuse are quite distinct.

The antennæ vary in structure with the sex. The three broader terminal joints are, in the females, very little longer in their aggregate than the six preceding joints, and not much more than twice as wide as they, while in the male the club is one and a half times the length of the funicle and three times as broad. The club in the male is more hairy than in the female, the hairs longer, and many of them placed vertically on the surface of the joints as in the males of many Elateridæ. In the males the eyes are larger and less separated in the front.

The surface of most of the species is clothed with a fine recumbent pubescence through which the color of the surface can easily be seen, the punctures of the striæ, however, bear somewhat longer and more erect pubescence. In *validus*, *punctatus* and *sericeus* the pubescence is extremely fine and without any semi-erect hairs. The species at present known are as follows:

Eyes entire ..... 2.
Eyes with a rather broad triangular impression at the lower border in front, not reaching the middle of the eyes; front strongly bicarinate ..... 3.
Eyes with a narrow oblique impression very nearly dividing the eyes into two equal portions; front indistinctly bicarinate ..... 4.

2.— Prosternal striæ much abbreviated.
Hind angles without trace of carina.
Clypeus distinctly carinate each side; pubescence of body very fine. **validus.**
Clypeus not carinate; pubescence coarse ..... **punctatus.**
Hind angles with a distinct but short carina close to the lateral margin: clypeus not carinate; pubescence moderately coarse. ..... **luvisus.**
Prosternal striæ entire or very nearly so.
Prosternum coarsely punctured in front, the striæ slightly abbreviated; hind angles not carinate ..... **constrictor.**
Prosternum smooth, the striæ entire; hind angles of thorax with a long but very fine carina ..... **alienus.**

Digitized by Google

3.—Frontal carinæ converging and uniting at the base of the clypeus, then strongly divergent..... .....**convergens.**

Frontal carinæ parallel from the occiput to the margin of the clypeus. **pugnax.**

4.—Prosternal striæ entire, usually parallel.

Elytral intervals biseriately punctulate; prosternum smooth.

Prothorax distinctly wider in front of hind angles; punctures of intervals distinct..... .....**Chevrolati.**

Prothorax gradually narrower from the basal angles; punctures of elytral intervals very fine and indistinct..... .....**mendax.**

Elytral intervals with a single series of punctures.

Prothorax relatively coarsely punctured; prosternum with a few coarse punctures in front.....**sejunctus.**

Prothorax sparsely finely punctate; prosternum smooth.....**parvulus.**

Prosternal striæ abbreviated.

Elytral intervals biseriately punctate; prosternum in front rather coarsely punctate..... .....**sericeus.**

Elytral intervals uniseriately punctate; prosternum almost entirely smooth in front..... .....**debilis**

In using the above table in reference to the species in which the elytral intervals are uni- or biseriately punctate, it must be remembered that in the uniseriately punctate species two intervals are confusedly punctulate, the second and the fourth.

Of the thirteen species enumerated above, six are from the Pacific region and seven from the Atlantic, and from our present knowledge most of the species have a limited distribution.

T. validus Lec.—Form oblong, rather more obtuse posteriorly, brownish, feebly shining, sparsely, finely pubescent. Front convex, rather coarsely punctured, the punctures denser anteriorly, a short carina each side close to the antennal fossæ. Thorax gradually narrower in front, the sides feebly arcuate, disc moderately convex, without basal depression, surface coarsely not closely punctate, punctures finer near the side, intervals very minutely, sparsely punctate, hind angles not carinate. Elytra a little wider than the thorax, surface striate, striæ closely punctate, intervals flat, biseriately punctate, the punctures nearly as coarse as those of the striæ. Prosternal striæ short, the prosternum smooth posteriorly, coarsely punctured in front. Metasternum and abdomen very coarsely and moderately closely punctate. Length .12-.18 inch; 3-4.5 mm.

This species is very nearly of the form of *punctatus*, but larger, with the surface less coarsely punctured and the prosternal striæ more abbreviated; the pubescence of the surface is very fine.

Occurs in California and Nevada.

T. punctatus Bonv.—Oblong, moderately shining, dark brown, sparsely very finely pubescent. Front coarsely and rather densely punctured. Thorax nearly twice as wide as long, sides rapidly converging to the front, very slightly arcuate near the hind angles, disc moderately convex, distinctly depressed in the

Digitized by Google

basal region, surface coarsely, equally and moderately closely punctate, the intervals very finely punctulate. Elytra not wider than the thorax, striate, striæ rather closely punctate, the intervals flat, closely sub-biseriately punctate, the punctures nearly as coarse as those of the striæ. Prosternum smooth posteriorly, coarsely sparsely punctate in front, the striæ abbreviated and parallel. Metasternum and abdomen coarsely and rather densely punctate. Length .12–.14 inch; 3–3.5 mm.

A somewhat less robust species than *validus*, with the basal region of the thorax depressed. The thorax is also different in form and the prosternal striæ longer. The surface pubescence is much coarser. In some specimens the hind angles of the thorax seem obsoletely carinate, in which case, from the table, it might be mistaken for *invisus*, which is, however, more robust with finer pubescence, the thorax less coarsely and closely punctate.

Occurs from Canada to Georgia.

T. invisus n. sp.—Form oblong, rather robust, obtuse posteriorly, piceous, moderately shining, pubescence not dense, moderately coarse. Front convex, coarsely not closely punctate, without trace of carinæ. Thorax twice as wide as long, arcuately narrowed from the hind angles, these acute moderately prolonged and with a short but distinct carina close to the lateral margin, disc convex, basal region moderately depressed, punctures rather coarse but not close, finer near the base and sides. Elytra not wider than the thorax, striate, striæ coarsely punctured, intervals flat, biseriately rather coarsely punctate. Prosternal striæ abbreviated, the surface between them coarsely sparsely punctate in front. Metasternum at sides and abdomen coarsely, rather closely punctate, the intervals between them alutaceous. Length .14 inch; 3.5 mm.

This species is of the same form as *validus*, but the pubescence is coarser, without being as coarse as in *constrictor*. The prosternal striæ are longer than in *validus*. It is best distinguished by the fine carina of the hind angles of the thorax.

One specimen, New York, given me by Mr. F. G. Schaupp. During a recent visit to the museum at Cambridge a number of specimens were seen in the cabinet of Dr. LeConte, all from the Middle States region, which show some variation in size above and below that given in my description.

T. constrictor Say.—Form oblong, brownish or piceous, moderately shining, sparsely pubescent. Front coarsely and moderately closely punctate. Thorax nearly twice as wide as long, rather strongly narrowed in front, sides feebly arcuate except near the base, disc convex, surface coarsely and rather closely punctate, hind angles not carinate. Elytra not wider than the thorax, striate, striæ punctate, intervals flat, sparsely biseriately punctate, the punctures finer than those of the striæ. Prosternum sparsely punctate, smooth at tip, the striæ slightly divergent and not quite entire. Metasternum and abdomen coarsely and moderately closely punctate. Length .10–.12 inch; 2.5–3 mm.

Digitized by Google

This species is narrower in form than *punctatus*, and with the basal depressions of the thorax more evident. The color may vary somewhat, a specimen in my cabinet having the elytra distinctly paler than the thorax.

With this species I have united *calocerus* Bonv., the characters given by that author are purely sexual.

Occurs in the Middle and Southern States.

T. alienus Bonv.—Reddish brown, moderately shining, moderately densely pubescent. Front convex, rather finely not closely punctate. Thorax twice as wide as long, strongly narrowed in front, sides feebly arcuate, disc moderately convex, coarsely and rather closely punctate, a distinct but not deep depression of the base each side of the middle, hind angles acute, moderately prolonged backward and extremely finely carinate. Elytra not wider than the thorax, gradually narrower posteriorly, surface striate, striæ distinctly punctured, intervals flat, very regularly biseriately punctate, the punctures finer than those of the striæ, a moderately deep depression beneath the humeri parallel with the lateral margin. Prosternum very nearly smooth, the striæ deep, entire and slightly divergent in front. Metasternum and abdomen moderately coarsely and closely punctate. Length .08–.10 inch; 2-2.5 mm.

A small species resembling some of the smaller forms of *Chevrolati*, but differing in the form of the eyes. From all our species it differs in the presence of the sub-humeral depression.

In his monograph this species is described as *constrictor* by Bonvouloir, the error was, however, subsequently corrected (Ann. Fr. 1860, p. 355).

Occurs in the Gulf States.

T. convergens n. sp.—Oblong, brown, moderately shining, pubescence sparse and rather coarse. Head coarsely sparsely punctate. Front acutely bicarinate, the carinæ converging, and uniting anteriorly at the base of the clypeus, then again diverging to the angles of the clypeus. Thorax nearly twice as wide as long, much narrowed in front, sides feebly arcuate, hind angles slightly prolonged and finely but distinctly carinate, disc moderately convex, a very feeble depression each side of the middle of the base, surface rather coarsely but not closely punctate, the intervals very finely sparsely punctate. Elytra not wider than the thorax, slightly narrowing toward the apex, surface striate, striæ punctate, intervals flat with a single series of punctures finer than those of the striæ, marginal stria of elytra rather deeper at base. Prosternum with very few punctures, the striæ deep, entire and nearly parallel. Metasternum and abdomen coarsely but not closely punctured. Length .10 inch; 2.5 mm.

A very distinct species by the emarginate eyes and the strongly carinate front, especially in the arrangement of the carinæ.

Occurs in northern Georgia.

T. pugnax n. sp.—Oblong, narrower behind, dark brown, moderately shining, rather coarsely pubescent. Head sparsely punctate, front with two rather strong carinæ which extend from the occiput to the front margin of the clypeus,

Digitized by Google

parallel on the head, divergent on the clypeus. Thorax less than twice as wide as long, sides arcuately narrowing from the basal angles to the front, hind angles very little prolonged and with a very distinct carina close to the lateral margin extending half way to apex; disc moderately convex, basal region scarcely depressed, surface rather finely sparsely punctate. Elytra gradually narrower posteriorly, finely striate, striæ finely punctured. intervals flat biseriately and rather sparsely punctate. Prosternal striæ entire, deep, parallel, the space between them nearly impunctate. Sides of metasternum coarsely punctate; abdomen coarsely not closely punctate, the intervals finely alutaceous. Length .08 inch; 2 mm.

This species and the preceding are the only ones in which the eye has the deep triangular impression in front, and the head strongly bicarinate. The hind angles of the thorax in the *pugnax* has a longer and more distinct carina than has been observed in any other species.

One specimen ♂, Florida. Cabinet of Mr. Ulke.

T. Chevrolati Bonv.—Brownish or ferruginous, moderately shining, surface rather coarsely pubescent. Head sparsely punctate, front obtusely bicarinate· the carinæ distant and parallel. Thorax nearly twice as wide as long, much narrowed in front, sides feebly arcuate, widest in front of the hind angles which are prolonged and indistinctly carinate, disc moderately convex, basal region not depressed, surface rather coarsely punctured, more densely at the sides and base. Elytra slightly narrower than the thorax, somewhat narrower posteriorly, surface striate, striæ distinctly impressed and punctate, intervals very regularly biseriately punctate with extremely minute punctures intermixed. Prosternum nearly smooth with very few punctures, the striæ deep, parallel and entire. Metasternum sparsely, rather finely punctured, abdomen more coarsely punctured, rather densely at the sides and apex, sparse at middle. Length .10 inch; 2.5 mm.

This species is readily known by its obliquely impressed eyes, bicarinate front and rather coarse punctuation. It varies in length a little below and above the measurement given.

Widely distributed from the New England States to Louisiana and Iowa.

T. mendax n. sp.—Oblong, moderately shining, ferruginous or reddish brown, moderately densely finely pubescent. Front sparsely, rather finely punctate, obtusely bicarinate, the carinæ distant and parallel. Thorax not quite twice as wide as long, strongly narrowed in front, sides feebly arcuate, hind angles prolonged and acute, not carinate; disc moderately convex, basal region somewhat depressed, surface closely and rather coarsely punctate. Elytra not wider than the thorax, striate, striæ punctured, intervals flat, very finely and indistinctly biseriately punctulate. Prosternum very nearly smooth at middle, the striæ deep, entire and slightly divergent in front. Metasternum and abdomen coarsely and rather closely punctate. Length .08–.10 inch; 2–2.5 mm.

The only species with which it might be confused is *sericeus*, which is much more finely and sparsely pubescent and with shorter prosternal striæ, the prosternum distinctly punctate in front.

Occurs in the Sacramento Valley, California.

Digitized by Google

T. sejunctus n. sp.—Oblong, very little narrower behind, reddish brown, feebly shining, moderately coarsely pubescent. Head obsoletely punctate, front obtusely bicarinate, the carinæ distant and parallel. Thorax less than twice as wide as long, the sides feebly arcuate, gradually narrowed to the front, hind angles not carinate, disc moderately convex, basal region scarcely depressed, surface rather coarsely and closely punctate, the intervals moderately punctulate. Elytra very little narrower posteriorly, striate, striæ punctate, intervals flat, the second and fourth biseriately punctulate, the others with a single series of punctures, surface between the punctures very minutely punctulate. Prosternal striæ deep, gradually evanescent in front and not quite entire, the space between them in front coarsely punctured. Metasternum and abdomen coarsely but sparsely punctate. Length .08 inch; 2 mm.

This species is placed in a series with entire prosternal striæ, although they are not quite entire as striæ, but continued for a short distance by punctures. The characters of the table will enable it to be distinguished from any with the striæ entire, while from *sericeus* it is known by its smaller size, coarse pubescence and the elytral sculpture.

Three specimens examined, California, that in my cabinet from the Mojave region.

T. parvulus Lec.—Ferruginous brown, moderately shining, surface moderately densely pubescent. Head sparsely punctate, front very obtusely bicarinate, the carinæ distant and parallel. Thorax one and a half times as wide as long, much narrowed anteriorly, sides nearly straight at apical portion, slightly arcuate near the hind angles, the latter prolonged, not carinate; disc moderately convex, slightly depressed at basal region, surface rather finely punctate, the punctures not closely placed. Elytra not wider than the thorax, slightly narrower posteriorly, finely striate, striæ finely punctured, intervals flat, with a single series of fine punctures. Prosternum smooth, the striæ deep, entire and slightly divergent in front. Metasternum at sides rather coarsely punctured, abdomen sparsely not coarsely punctured. Length .06–.08 inch; 1.5–2 mm.

This is the smallest species known to me in our fauna, and is known by the obliquely impressed eyes, obtusely bicarinate front, and from *Chevrolati* by the punctuation of the surface.

The only mention of this species by Dr. LeConte is in the List (Smithsonian Contributions 1863, vi, No. 140, p. 44) the description has never been published, and the present description will therefore be accepted as part of his posthumous contribution.

Occurs in California, Mojave and Yuma.

T. sericeus Lec.—Oblong, brown, feebly shining, surface sparsely and very finely pubescent. Head rather sparsely punctate, front obtusely bicarinate, the carinæ distant and parallel. Thorax not twice as wide as long, narrowed in front, sides moderately arcuate, hind angles prolonged and acute, not carinate; disc moderately convex, slightly depressed at base, surface coarsely and moderately densely punctured at the sides and base, more sparsely and finely at middle. Elytra not wider than the thorax, slightly narrowed posteriorly, surface moderately

Digitized by Google

deeply striate, the striæ punctured, intervals flat, biseriately punctulate. Prosternum smooth posteriorly, coarsely sparsely punctate in front, striæ deep, parallel, but not entire. Metasternum and abdomen coarsely but not closely punctate. Length .10 inch; 2.5 mm.

This species is usually mixed in cabinets with *mendax*. It is, however, more finely and sparsely pubescent, the frontal carinæ more distinct and with abbreviated prosternal striæ.

Occurs in California, and widely diffused.

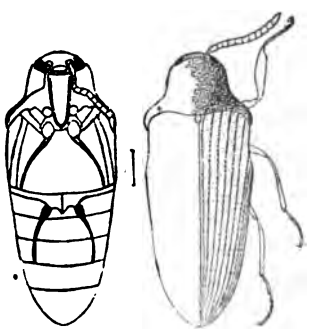
T. debilis n. sp.—Form oblong, scarcely narrowed behind, castaneous or ferruginous feebly shining, pubescence not dense, rather fine. Head indistinctly punctate, front obtusely bicarinate, the carinæ parallel and distant. Thorax about one and a half times as wide as long, gradually arcuately narrowed to the front, hind angles very little prolonged, not carinate; disc moderately convex, basal region not depressed, surface with intermixed moderately close punctuation. Elytra finely striate, the striæ finely punctate, intervals flat, the second and fourth irregularly biseriately punctulate, the others with a single series of punctures. Prosternal striæ extending very little in front of middle, the prosternum with very few and very fine punctures. Metasternum and abdomen obsoletely, very sparsely punctate. Length .08 inch; 2 mm.

In this species the prosternal striæ are so much abbreviated that there is no difficulty in distinguishing it from any of those with obliquely divided eyes.

Occurs in Oregon and Washington Territory.

PACTOPUS Lec.

Antennæ fusiform, a little longer than the head and thorax, received in deep sinuous grooves in the sutures of the prosternum and which extend outwardly to the hind angles of the prothorax, the tip of the antennæ resting against the elytral humeri; first joint obconical, nearly twice as long as the second which is slightly transverse; joints 3–7 nearly square, closely articulated, 8–10 very little larger, eleventh one-half longer, acute at tip. Eyes entire.



Tarsi long and slender, the joints simple, the first as long as the next three; middle and posterior tarsi received in grooves, those for the middle pair are on the metasternum and divergent, reaching the hind coxæ; those for the hind pair extend from the base of the first ventral segment to the posterior margin of the third and are also divergent.

Digitized by Google

The characters above given are essentially the same as those given by Dr. LeConte, the only other point in which it is observed to differ from Throscus is in the sudden oblique narrowing of the anterior tibiæ at tip.

There is but one species at present known.

P. Hornii Lec.—Form rather elongate, dark brown or piceous, moderately shining, surface clothed with fine short silken pubescence. Head moderately coarsely and closely punctate, front convex. Thorax nearly twice as wide as long, form rather broadly campanulate, the sides rather deeply sinuate at middle, the hind angles acute and prolonged over the humeri of the elytra, not carinate; disc moderately convex, slightly depressed at base, surface rather coarsely and closely punctate, a little more finely in front. Elytra a little narrower at base than the thorax, then slightly wider posteriorly, after which they narrow slightly to apex, surface striate, striæ punctate, the punctures a little more evident at apex, intervals flat, finely alutaceous with obsolete punctures distantly placed in a single series. Prosternum coarsely sparsely punctate, the striæ deep, slightly divergent and entire. Metasternum coarsely and closely punctate. Abdomen less coarsely and less closely punctate, the last segment more finely. Length .12–.18 inch: 3–4.5 mm.

The specimens examined show no sexual differences except that the males are somewhat more slender.

Occurs in California and Nevada.

DRAPETES Redt.

Antennæ serrate from the fourth to the tenth joint, received in well defined grooves in the anterior portion of the prosternal suture. Tarsi not received in grooves either in the metasternum or abdomen.

As the characters of the genus are so thoroughly given in many places, the few words above will suffice at this time.

Our species are few in number, and as they differ remarkably in color this character can be made use of for separating them, the structural characters will be given in the specific descriptions.

Thorax black.
- Elytra with a broad sub-basal red fascia ..... **geminatus.**
- Elytra with humeral and sub-apical red spots ..... **quadripustulatus.**
- Elytra entirely black ..... **nitidus.**

Thorax red, elytra black ..... **rubricollis.**

All our species have a humeral carina which is the basal termination of a submarginal stria, the true elytral margin is below this carina. The carina of the basal angles of the thorax is also well marked, and in *geminatus* long, a character which has been passed in silence by Bonvouloir.

D. geminatus Say.—Black, shining, very sparsely pubescent, a broad sub-basal red fascia on the elytra sometimes divided at the suture or reduced to a round spot on each side. Antennæ piceous, under side and tip of first joint testaceous.

Digitized by Google

Thorax as wide at base as long, gradually narrowing to the front, disc moderately convex, carina of the hind angles distinct extending two-thirds to apex, surface moderately coarsely sparsely punctured, the punctures coarser near the hind angles and finest near the front angles. Elytra a little wider than the thorax, sparsely irregularly punctate, the punctures much finer than the thorax, a distinct humeral carina above the true epipleural margin. Prosternum punctured in front, nearly smooth posteriorly, on each side bistriate, the striæ rather deep, extending three-fourths to the front and equal in length; inflexed sides of prothorax coarsely punctured. Metasternum and abdomen more finely, not closely punctate. Length .16 inch; 4 mm.

Occurs in Illinois, Georgia and Maryland.

D. quadripustulatus Bonv.—Piceous black, shining, very sparsely pubescent, each elytron with a sub-humeral and sub-apical reddish spot, the latter smaller. Head sparsely punctate, antennæ piceous. Thorax a little wider than long, gradually narrowed in front, disc moderately coarsely punctate, the punctures finer in front, carina of the hind angles short extending but one-third to apex. Elytra a little wider than the thorax, very sparsely and irregularly punctate, humeral carina distinct. Prosternum coarsely sparsely punctate in front, smooth posteriorly, on each side bistriate, the striæ deep, extending three-fourths to apex, inflexed sides of pronotum coarsely punctate. Metasternum and abdomen rather finely and sparsely punctate. Length .16 inch; 4 mm.

This species has a more robust facies than the preceding and is more convex. It differs at first sight in color and will be observed to have a much shorter thoracic carina.

Occurs from Wisconsin to Florida.

D. nitidus Mels.—Piceous black, shining, very sparsely pubescent. Head sparsely punctate. Thorax as wide at base as long, the sides straight, slightly convergent anteriorly, disc moderately convex, punctures rather sparse at middle, a little coarser and closer near the base, carina long, extending two-thirds to the apex, very close to the margin posteriorly. Elytra a little wider than the thorax, slightly narrower posteriorly, sparsely punctate and more finely than on the thorax, humeral carina distinct. Prosternum sparsely punctate in front, each side bistriate, the striæ extending two-thirds to the front. Flanks of prothorax, sides of metathorax and abdomen moderately coarsely punctured. Length .16 inch; 4 mm.

The only specimen I have seen of this species is the type of Melsheimer, now in the cabinet of the late Dr. LeConte. It resembles *geminatus*, except that it is entirely piceous, and, as suggested by Melsheimer, may possibly be a variety of that species.

One specimen, Pennsylvania.

D. rubricollis Lec.—Black, shining, sparsely pubescent, thorax above and beneath red. Head sparsely punctate, antennæ piceous. Thorax wider than long, sides arcuately narrowing to the front, disc convex rather coarsely but sparsely punctured, the punctures finer near the front angles, carina of the hind angles short. Elytra very little wider than the thorax, gradually narrower behind, humeral carina distinct, surface sparsely irregularly punctate. Prosternum coarsely punctate and piceous in front, posteriorly smooth on each side bistriate, the outer

Digitized by Google

striæ extending two-thirds to apex the inner much shorter; inflexed sides of pronotum sparsely punctate. Metasternum and abdomen a little more finely, not closely punctate. Length .10–.12 inch; 2.5–3 mm.

This species is easily known by its small size, the color and the abbreviated intermediate prosternal striæ.

Occurs in Florida.

Synonomy and Bibliography.

THROSCUS Latr.

T. validus Lec., Trans. Am. Ent. Soc. 1868, p. 63.
T. punctatus Bonv., Monog. p. 15, pl. 1, fig. 3.
T. invisus n. sp., supra.
T. constrictor Say, Trans. Am. Philos. Soc. vi, p. 189; Bonv. Ann. Ent. Soc. Fr. 1860, p. 355, pl. 8, fig. 3.
calocerus ♂ Bonv., Ann. Fr. 1860, p. 354, pl. 8, fig. 2.
T. alienus Bonv., Ann. Fr. 1860, p. 357.
constrictor ♀ Bonv., Monog. p. 13, pl. 1, fig. 2.
T. convergens n. sp., supra.
T. pugnax n. sp., supra.
T. Chevrolati Bonv., Monog. p. 21, pl. 1, fig. 7.
T. mendax n. sp., supra.
T. sejunctus n. sp., supra.
T. parvulus Lec., List p. 44 (posthumous description above).
T. sericeus Lec., Trans. Am. Ent. Soc. 1868, p. 63.
T. debilis n. sp., supra.

PACTOPUS Lec.

T. Hornii Lec., Trans. Am. Ent. Soc. 1868, p. 64.

DRAPETES Redt.

D. geminatus Say, Ann. Lyc. 1, p. 265; Bonv. Mon. p. 70.
extriatus Say, Trans. Am. Phil. Soc. vi, p. 177.
D. quadripustulatus Bonv., Mon. p. 74, pl. 3, fig. 2.
D. nitidus Mels., Proc. Acad. ii, p. 149.
D. rubricollis Lec., New Species, 1863, p. 82.

Digitized by Google

The North American CHRYSIDIDÆ.

BY S. FRANK AARON.

The materials upon which this monograph is based are the almost perfect collections of the American Entomological Society, containing the types of Messrs. Cresson and Norton, together with a large number of undescribed forms, and the collection of M. Provancher, of Canada, kindly loaned me for study, containing all his type specimens described in the "Naturaliste Canadien," with other rare and interesting species. Only four species treated of in the following pages are wanting in the material at hand, and furthermore I had the advantage of having Mr. Norton's determinations of many species in his paper now in the Society's collection. More than four times the material has since then been added to the collection.

I believe that there is generally a strong separation between the fauna of the United States and that of Mexico and the Antilles, and I have described only those forms found in America North of Mexico. An examination of a number of Cuban forms belonging to several genera convinced me that there is a slight, but constant difference, in that the Cuban specimens have the thorax rich, light emerald-green, with brassy reflections and without blue, while the abdomen is more or less deep blue and purple with some green reflections. Color is of very slight importance in the separation of species, but the absolute contrast of color upon different parts of the same insect, together with its being constant in individuals, alters the case in favor of specific distinction. For this reason I have left certain Cuban species heretofore considered equal to a few of our species out of the synonymy. I have also erected four sub-families much after the manner of Dahlbom's families.

It has been my purpose not only to give diagnostic descriptions of genera and species, but in the descriptions of each form to mention the inconstant or gradational variations of individuals in order that students may readily appreciate absolute and constant differentiation. This has been rendered the more certain by the large material at hand. I have endeavored to avoid mentioning characters common to every individual in the family, and have for the most part noticed these characters in the following description.

Digitized by Google

Colors always metallic and shining, extending upon the scape and sometimes one or two of the following antennal joints and upon the femora and tibiæ. Articles of the antennæ beyond the scape to the apex, and also the tarsi, dull brown, the latter sometimes luteous. Head, thorax and abdomen covered, or partly covered, with more or less distinct punctures, which are generally largest upon the metathorax, and becoming large, shallow, foveolæ on each side of the metanotum. Scape, tegulæ and the femora and tibiæ with generally fine indications of the punctures; three distinct ocelli; antennæ with thirteen articles; tarsi with five articles, the basal one long, the others very short, subequal; wings hyaline, generally more or less tinted with dark colors; mesothorax with two longitudinal sutures dividing it into three equal parts; posteriorly on each side of the metanotum a produced, pointed, triangular spine, in a few specimens these are only indicated by obtuse angles. When the tergum is bent the extreme base of the second and third segments expose black or purple colors.

No doubt but that exception will be taken to the manner in which I have separated and amalgamated genera and species, but I have in every instance endeavored to reconcile the inferences drawn with the principles of natural classification.

The detailed figures illustrate the important described differences in the forms. For this purpose a powerful but large magnifying glass was used, and great care was exerted to render them accurate.

SUB-FAMILIES.

Face entirely convex. Prothorax as long, or longer than wide, and longer than the mesothorax, with a distinct arched suture crossing its anterior portion. Metanotum almost equally elevated with the other portions, giving the dorsum of the thorax the appearance from above of four distinct parts except the prothorax. Abdomen convex beneath, the lateral margins not extending beyond the surface of the venter. Segments of the tergum 4 and 5..... **Cleptinæ.**

Face more or less concave (a receptacle for the scape or long basal joint of the antennæ). Prothorax much wider than long, suboblong, always shorter than the mesothorax. Metanotum beneath the postscutellum at an angle 90°, giving the dorsum of the thorax the appearance from above of 3 distinct parts, excepting the prothorax. Abdomen concave beneath, caused by the lateral margins extending beyond the surface of the venter. Segments of the tergum 3, except in the ♂ of Parnopes, which has 4.

"Maxillæ and labium ordinary, ligula subconical" (not produced) "exterior process of maxillæ rounded, obtuse." [Dahlbom.]

Third abdominal segment without submarginal groove, declivity, or series of pits interrupting the evenness of its entire surface. Discoidal cellule wanting, or formed only by dark colored indications of the nervures.

Elampinæ.

Digitized by Google

Third abdominal segment with a submarginal series of more or less deep and rounded pits or broad foveolæ, contained in a groove or declivity, which causes the surface of the marginal area to be uneven with and below the general surface of the segment. Discoidal cellule (except in *C. verticalis* Patton, and therefore generally) formed by the absolute nervures and entirely closed.....**Chrysidinæ.**

" Maxillæ and labium abnormal, ligula and process of maxillæ very long, extended into a slender filiform beak, resembling the proboscis of Bees, bent back under the thorax in repose." [Dahlbom] Discoidal cellule formed only by indications of the nervures, a broad deep submarginal groove on each side of the apical half of the last segment of the tergum, without pits. Segments of abdomen, ♂ 4, ♀ 3.....**Parnopinæ.**

Sub-family—CLEPTINÆ.

CLEPTES Latr.

Gen. Cr. et Ins. iv, 44.

Color metallic green, blue, or purple, or with reflections of all these colors.

Head and thorax the same general color as the abdomen.

General color of the body blue, with purple and green reflections, femur dull, with little of the metallic color of the body, tibia with little or no metallic, about as in the tarsi. Wings evenly infuscated.....**purpurata.**

General color of the body emerald-green, with little or no purple or blue, except on the postscutellum. Femur and tibia strongly colored with metallic green, in contrast with the tarsi, which is luteous at base, fuscous apically. Wings subhyaline.

Face and abdomen with golden reflections.....**aliena.**

Face and abdomen without distinct golden reflections.....**insperata.**

Head and thorax green, the abdomen metallic black with some slight green, purple and blue reflections.....**Provancheri.**

Color elegant metallic ruby and golden with some green (appearing generally red). **speciosa.**

Cleptes purpurata Cresson, Trans. Am. Ent. Soc. vii, 1878–79, Monthly Proc. p. 10, May, 1879.

Cleptes americana Cresson, loc. cit.

The collection contains five specimens of the larger form (*purpurata*) 7–6 mm. long, from Vancouver's Island (Mr. Cresson's type), Washington Territory and Southern California; nine specimens of the smallest form (*americana*), 5.5 mm. long from Nevada, and three specimens of the amalgamating form, intermediate in size, from Washington Territory. Otherwise all these forms do not differ. ♂. ♀.

Cleptes aliena Patton, Can. Ent. vol. xi, p. 66, April, 1879.

There is one male specimen from Montana in the collection which agrees with Mr. Patton's description almost exactly, except that the tarsi are luteous, fuscous only at the apex, the posterior tibiæ only, with black

Digitized by Google

on the inside, and the color is probably less blue, with a little stronger golden reflection. I feel very positive that this specimen, together with a series to show the variations, will prove identical with Patton's *aliena*.

Cleptes Provancheri Aaron. *Cleptes americana* (name preoccupied) Provancher, Nat. Can. xii, 304, July, 1881.

Before me are seven specimens ♂ ♀ from Canada (two specimens, one of which is Provancher's type), Colorado and Washington Territory 5–6 mm. long.

The color is emerald-green on the head and thorax with or without bluish reflections; abdomen blackish shining, with green reflections on the margins. Wings subhyaline, tibia with some greenish reflections outwardly; otherwise, and with the tarsi, varying from luteous to fuscous. Almost necessarily M. Provancher's *americana* must fall, Mr. Cresson having used that name in 1879.

Cleptes insperata n. sp.—Emerald-green, with more or less slight blue and purple reflections, rather sparsely and evenly punctured. Wings subhyaline on the centre, in places infumated. Tarsi luteous, rest of legs largely green outwardly; 6–6.5 mm. long. ♀.

Montana, four specimens; between *purpurata* and *aliena*.

Cleptes speciosa n. sp.—Elegantly colored with ruby, golden and green, the metanotum emerald-green with a slight bluish reflection, evenly and sparsely punctured, smoothest on the scutellum; abdomen black, shining on the disc, with the metallic reflections broadly on the sides and the whole of the fourth segment; wings subhyaline, or infumated; femora metallic (the anterior pair purplish in one specimen), tibia and tarsi luteous, fuscous at base and apex in one specimen; first joint of antennæ with purplish reflection; 5 mm. long. ♀.

Montana, two specimens. An elegant and very distinct species.

Sub-family—ELAMPINÆ.

Tarsal claw with 2–6 distinct teeth between the base and apex.

The apical margin of the third abdominal segment is simply notched, rounded, not produced as seen laterally ..... **Omalus.**

The apical margins of the third abdominal segment pinched on each side of the notch or emargination, forming, as viewed laterally, a snout-like projection that appears truncated.

The emargination or notch of the apex open, not filled up with a membrane.

The surface of the third segment above the apical snout-like projection even, not produced ..... **Elampus.**

The surface of the third segment just above the snout-like projection produced into a cone shaped piece forming the direct apex of a fold which extends on each side just above the apical and lateral margins. **Diplorrhos.**

The emargination or notch of the apex closed, or partly filled up by a membrane, which is excised beneath ..... **Notozus.**

Digitized by Google

The apical margin of the third abdominal segment entire or broadly sinuate. **Holopyga.**

Tarsal claw with one small perpendicular tooth in the middle. **Hedychridium.**

Tarsal claws bifid at the apex, without inner teeth..... **Hedychrum.**

OMALUS Jurine.

Nouv. Meth. Classer les Hym. 300, 1807.

The occiput, disc of prothorax and mesothorax smooth, or with slight indications of punctures; front, anterior and lateral margins of prothorax, sides and the metathorax strongly punctured; postscutellum rounded, not projecting; abdomen smooth, with sparse, very fine punctures; apical margin of third segment rounded, notched; 2–6 teeth within the tarsal claw.

Two teeth within the tarsal claw, median lobe of mesothorax not strongly punctured posteriorly.

Margin of third abdominal segment semi-transparent yellowish, broadest at apex..... **iridescens.**

Margin of third abdominal segment not semi-transparent yellowish, but concolorous with the segment.

Smoothed areas metallic blackish (the color of antique bronze), without purple reflections; apical corners of second abdominal segment not projecting beyond, but even with the base of third segment..... **diversus.**

Smoothed areas blue and green, with purple reflections; apical corners of second abdominal segment projecting beyond the base of third segment. **læviventris.**

Three to six teeth within the tarsal claw, median lobe of mesothorax not strongly punctured posteriorly.

Lateral margins of third abdominal segment straight or unisinuate, apex on each side of notch rounded, not produced beyond line of margin, notch not forming a perfect semi-circle, but subangulated.

Notch as deep as broad, angle less than 90°..... **sinuosus.**

Notch much wider than deep, angle over 90°..... **corruscans.**

Lateral margins of third abdominal segment bisinuate, the apex on each side of the notch pointed, somewhat produced beyond the line of margin; notch forming a semi-circle..... **semicircularis.**

Omalus iridescens.

Elampus iridescens Norton, Trans. Am. Ent. Soc. vii, p. 234, 1879.
Elampus marginatus Provancher, Nat. Can. xii, 304, 1881.

Eight specimens from Canada (Provancher's types), New Hampshire, Pennsylvania and Colorado. They are all perfectly identical, except varying in size from 3.5–4.5 mm.

Omalus diversus n. sp.—Without purple reflections, head and thorax with the smoothed areas blackish, shining, the color of antique bronze, punctured areas green; median lobe of mesothorax not strongly punctured posteriorly; abdomen polished, with green and slightly blue reflections on the lateral margins;

Digitized by Google

third segment with its lateral margins short, a little sinuate, notch as deep as broad, its angles less than 90°; 2 teeth in claw; 4 mm. long. ♀.

California, one specimen.

Omalus læviventris Cresson, Proc. Ent. Soc. Phila. iv, 303, 1865.

Elampus læviventris Norton, Trans. Am. Ent. Soc. vii, p. 234, var. *cyanescens.*

Elampus cyanescens Provancher, Nat. Can. xii, p. 303, 1881.

From Colorado (Mr. Cresson's type), California, New Hampshire and Canada; also the type of *cyanescens*, in M. Provancher's collection, from Canada. Three specimens from Colorado are larger than the type, one specimen intermediate. One specimen from California is darker, no green except on the face, and a slight reflection on the abdomen, intermediate in size. Three specimens from Canada and two from New Hampshire also grade in size, and vary slightly in depth of color, and have the lateral margins of third segment less sinuate, with the notch not as deep; these constitute the var. *cyanescens;* thirteen specimens in all; from 4.5–5.5 mm. long.

Omalus sinuosus.

Hedychrum sinuosum Say, Macl. Lyc. i, 82, 1828.

Elampus sinuosum Norton, Trans. Am. Ent. Soc. vii, 234.

Hedychrum janus Hald., Proc. Acad. Nat. Sci. Phila. ii, 55, 1844.

Elampus purpurascens Provancher, Nat. Can. xii, 303, 1881.

Five specimens from Illinois (Mr. Norton's determinations), eight from Colorado and one each from Montana and California; also five specimens in Provancher's collection from Canada, one of which is the type of *purpurascens.* The specimens from Illinois, with two from Canada, have the thorax bronzed and violet, with an absence of green or blue to a more or less degree; the Western specimens and the other Canadian specimens are less bronzed and violet with green reflections, and green on all the punctured areas, but I find in this character a great tendency to vary; some specimens from Colorado, and that from California, having the punctured areas mostly blue, while in two Illinois specimens they are slightly green or blue. Several Western and Canadian specimens are dull dark blue with green reflections, having but a slight tinge of violet on the abdomen, and in others with all violet reflections wanting entirely. The size of the Illinois specimens is from 3–5 mm., the Canadian 4 mm., the Western specimens from 3–6 mm. long.

Omalus corruscans.

Elampus corruscans Norton, Trans. Am. Ent. Soc. vii, 234, 1879.

Nine specimens in the collection from Canada (Norton's type), New Hampshire and one from New Mexico (Norton gives Connecticut also).

Digitized by Google

The Eastern specimens are all perfectly identical, 6.5 mm. long, while the specimen from New Mexico is 4 mm. long, the thorax with more green than the others, but with the abdomen similarly colored. Otherwise, and in the notch, it is the same. *Elampus corruscans* of Provancher belongs to *Notozus*.

Omalus semicircularis n. sp.—Green and blue with purple reflections; head and thorax pilose, the smoothed areas not very well defined, with scattered punctures. Second joint of antennæ a little green; abdomen strongly pilose on the sides and all over the third segment; margins of third segment bisinuate, and on each side of the large semi-circular notch a little produced; median lobe of mesothorax strongly punctured posteriorly; 5 teeth in the tarsal claw; 5.5 mm. long. ♂.

Colorado, one specimen; very distinct.

ELAMPUS Spinola.

Brullé Nat. Hist. des Ins. Hym. iv, 53, 1846.

Occiput with the punctures sparse, leaving some smooth areas; prothorax smooth, the anterior margin punctured more numerous laterally, the posterior margin with one row of punctures and several larger punctures in the middle placed irregularly; mesothorax polished, the sutures with each an irregular row of punctures lengthwise and the sides above the tegulæ with a single regular row; mesothorax evenly punctured, the postscutellum as viewed laterally even, or nearly even, not forming a horizontal blade as in most species of *Notozus*. Species, however, may be found that possess this character to a marked degree, as it shows itself to be variable in both genera.

Dorsum of postscutellum as viewed laterally even, not projecting posteriorly.
Entire lateral margins of third abdominal segments arcuated, or with a single broad shallow sinus; the snout-like prolongation of apex very slight, abrupt ..... **Cressoni.**
Lateral margins of third abdominal segment with two arcuations, or bisinuate, the prolongation strong, tapering..... **variatus.**
Dorsum of postscutellum, as viewed laterally, projecting a little posteriorly. **speculum.**

Elampus Cressoni n. sp.—Head and thorax with the smoothed areas dark blue with slight purple reflections, punctured areas with green reflections; abdomen dark blue, purple and green, third segment short, abrupt; margins with a single arcuation or sinus, the snout-like projection slight, *i.e.* hardly extending from the ordinary line of the margins, but truncated; tarsal claws with two teeth; 3–3.5 and 4 mm. long. ♂. ♀

Montana and Colorado, three specimens.

Elampus variatus n. sp.—In the majority of my specimens the head and thorax have the smoothed areas dark green with blue and slight purple reflec-

Digitized by Google

tions; punctured areas green; abdomen dark blue with strong purple and green reflections. In other specimens the smoothed areas are dark blue with strong purple reflections, the punctured areas green, and the abdomen as above. In three specimens the smoothed areas are purple, in two of these the punctured areas purple and blue, the other specimen purple only, and the abdomen all purple with slight green reflections. Another specimen has dark, blackish blue, smoothed areas, punctured areas green, the abdomen black, with slight green reflections; third segment of abdomen tapering gradually towards its apex, the snout-like projection strong, the margins bisinuate, the apical one deepest, a ridge above the notch caused by its sides being suddenly bent downwards. The notch in most of the specimens is broad, the sides divaricate, in others it is drawn more closely together, appearing narrow and deep, with the sides almost or fully parallel; the claws with two, three and four teeth, the basal ones smallest; 4–4.5 mm. long. ♂. ♀.

Montana and Colorado; sixteen specimens. The divarication of the notch is most probably caused by the extension of the ovipositor, those having the divaricate notch being mostly females.

Elampus speculum.

Hedychrum speculum Say, Bost. Journ. i, 285, 1835.
Elampus speculum Norton, Trans. Am. Ent. Soc. vii, p. 234.

One specimen from Illinois (Mr. Norton's type); emerald-green, with some little purple and blue; wings infuscated; postscutellum conical, a little produced; margins of third segment bisinuate; 4 mm. long; three teeth in the claw. ♂.

DIPLORRHOS nov. gen.

The single species forming this genus agrees with the description of *Elampus*, with the exception of the following diagnostic character: just above the snout-like truncated projection of the apex of third segment *is a conical projection, forming the apex of a fold which extends on each side just above the apical and lateral margins.*

Diplorrhos plicatus n. sp.—Color in some specimens bright green, with bluish and brassy reflections, and little, if any, purple; darkest or nearly blue on the occiput; other specimens dark blue with deep purple reflections, greenish on the punctured areas, one specimen green, with dark blue reflections, and some purple on the abdomen, and two others dark blue with purple and green, the dorsum of abdomen shining black, the sides green and blue with a little purple; postscutellum as viewed laterally obtusely pointed and projecting a little posteriorly; the depth of the arcuations on margin of third abdominal segment varies in different specimens, as does also the distinct appearance of the submarginal fold; truncation of the apex as viewed laterally slightly rounded at the end, the notch very narrow, almost closed, the sides rounded, diverging; 2–3 teeth in the claw; 3.5–4.5 mm. long. ♂. ♀.

Montana, Colorado; nine specimens.

Digitized by Google

NOTOZUS Förster.

Verhand. der Naturhist. Vereins der preuss. Rheinlande x, 331, 1853.

Head and thorax all over about evenly punctured in most of the species, the occiput, pro- and mesothorax, more or less sparsely punctured; in some densely, in others, like *Elampus*, with smoothed areas. Abdomen closely and finely punctured; in some simply roughened by the punctures being shallow and confluent; margins of third segment bisinuate. The postscutellum in most of the species projecting into a well defined cone shaped piece or blade, which is flat above and rounded apically, but in other species this is only indicated by the postscutellum being obtusely mucronate, hardly projecting as seen laterally. The genus was originally founded on the prolongation of the postscutellum, and though this character is inconstant, it is generally correllated with the true diagnostic character, viz.: *apex of third segment with the snout-like projection filled up by a membrane that is triangularly excised beneath.*

Postscutellum somewhat obtusely pointed but not projecting posteriorly into a horizontal blade.....**intermedius.**

Postscutellum prolonged posteriorly into a raised, partly separate, horizontal blade or cone.

Pro- and mesothorax mostly smooth, the former punctured only on the anterior, lateral and posterior margins, and sparsely in the middle, and the latter with sparse punctures on the sutures; lateral margins of third segment with the apical half semi-transparent, brown. **seminudus.**

Pro- and mesothorax nearly evenly covered with punctures; lateral margins of third segment concolorous with the rest of the abdomen.

Abdomen bright golden and cupreous, with brassy and green reflections, thorax green and blue.....**nitidus.**

Abdomen like head and thorax, from dark blue with purple reflections to emerald-green with brassy reflections.

Wings clear hyaline, not infuscated.....**hyalinus.**

Wings infumated or infuscated.

The snout-like projection at abdominal apex with its closing membrane semi-transparent brown, and with a band of the same color before its apical margin.....**versicolor.**

The snout-like projection with its closing membrane black, concolored before its apical margin.

Abdomen, in shape, ordinary; about as long and wide as most of the species of this genus and its allies; the snout-like projection also median in size.

The snout-like projection of abdomen broad, short, not projecting very distinctly beyond the line of the margins of third segment. **viridicyaneus.**

The snout-like projection is longer and narrower, projecting distinctly beyond the margins of third segment.....**marginatus.**

Abdomen longer and narrower, the snout-like projection larger in relation to the third segment than in other species....**productus.**

Digitized by Google

Notozus intermedius n. sp.—Green, blue and fuscous on the dorsum of postscutellum; occiput very sparsely punctured, leaving smooth areas; prothorax with the anterior, lateral and posterior margins closely and broadly punctured, with some scattered punctures in the middle, leaving a narrow, smooth area across the middle on each side; mesothorax smooth, a double row of close punctures along the sutures, and few over the tegulæ; metathorax with large, rather divided punctures; the postscutellum not produced, but high and obtusely pointed posteriorly; abdomen with the first and second segments finely and sparsely punctured, larger and somewhat confluent on the third segments; margins of third segment broadly semi-transparent brown on apical half, apical prolongation slender, high, the truncation, as viewed posteriorly, elliptical; the closing membrane black; wings infuscated; 4 teeth in the claws; 4 mm. long. ♂.

Montana; one specimen; very distinct, but in some of the general characters intermediate between *Elampus* and *Notozus*.

Notozus seminudus n. sp.—Blue, with green and purple reflections, rather dull; occiput smooth, with a few small punctures in groups or rows; prothorax smooth on the disc, a few scattered punctures in the middle, the anterior and lateral margins closely punctured, the posterior margin with a single even row of punctures; mesothorax smooth, a few scattered punctures on the median sutures and above the tegulæ; metathorax evenly and strongly punctured, dull blackish or fuscous, with very little or no metallic reflections; abdomen with the first segment partly smooth, the second very finely and sparsely punctured, the third with the punctures much larger, confluent, appearing roughened; apical projection small, almost coming to a point, the truncation circular, the closing membrane black or fuscous; wings infuscated; 3–4 teeth in the claw; 5–6 mm. long. ♂. ♀.

Washington Territory; four specimens.

Notozus nitidus n. sp.—Head and thorax green, purple and blue, dull on the postscutellum, occiput, pro- and mesothorax sparsely, but almost evenly punctured; abdomen sparsely and finely punctured, elegantly colored with golden cupreous and some green reflections; venter green; femora and tibia green and blue, apical closing membrane black; wings infuscated; 3.5–4 mm. long. ♂.

Montana and California; two specimens; a most beautiful and very distinct species.

Notozus hyalinus n. sp.—Entirely green, blue and purple, dull on the postscutellum; occiput pro- and mesothorax sparsely but evenly punctured; abdomen sparsely and very finely punctured; apical projection evenly rounded above, the end circular; membrane black; wings clear hyaline; 4–4.5 mm. long. ♀.

Montana and Nevada; three specimens.

Notozus versicolor.

Elampus versicolor Norton, Trans. Am. Ent. Soc. vii, 235, 1879.

One specimen from Dakota (the type) and one from Montana. The first is dark blue and purple with green reflections, while the Montana specimen is emerald-green with very little blue and no purple. The

Digitized by Google

punctures on the abdomen less confluent and more distinct, and the roughened surface less marked than the Dakota specimen. The Montana specimen with the apical projection a little less pronounced than the type; 5–5.5 mm. long.

Notozus viridicyaneus.

Elampus viridicyaneus Norton, Trans. Am. Ent. Soc. vii, 235, 1879.
Elampus coruscans (Norton) Provancher, Nat. Can. xii, p. 303.
Elampus spinosus Provancher, ibid, p. 302, 1881.

Four specimens from the localities: Massachusetts (type), Colorado and Montana, and two specimens in the collection of M. Provancher from Canada, the type of *spinosus*, and the specimen determined as *Omalus coruscans* Norton. The color is green, purple and blue, about equally distributed, except in the Colorado specimen, which has less green and more blue. Punctures on occiput pro- and mesothorax rather sparse and subeven, but in one Montana specimen the punctures are close and regular. The apical projection of the third segment is short, large, semicircular, the closing membrane black. *Spinosus*, of Provancher, does not differ, it is not so large as the specimen from Colorado, the continuation of the metallic color upon the tarsi and antennæ is a variable character and of no importance, and the spine beneath and at the apex of the tibia is present in all the species; 3 and 4 teeth within the claw; 5.5–6 mm. long.

Notozus marginatus Patton, Can. Ent. xi, p. 66, 1879.
Elampus viridis (Cresson) Provancher, Nat. Can. xii, p. 303.

Twenty specimens in the collection from the following localities:—Canada, New Hampshire, Montana, Washington Territory, British Columbia, Colorado and California; also three specimens in Provancher's collection determined as *viridis* Cresson. Specimens vary wonderfully in color from emerald-green with golden reflections and bright blue with purple reflections to deep dull black with very little purple; apical closing membrane black; 3.5–5 mm. long.

Notozus productus n. sp.—Long and slender; bright emerald-green with blue and some purple reflections, duller on the postscutellum; occiput pro- and mesothorax rather sparsely but somewhat evenly punctured; abdominal punctures very close or confluent, so as to cause the surface to appear roughened; abdomen lengthened, longer than in the other species, the third segment evenly tapering, comparatively less so than in other species; apical projection large, even, semi-circular, the closing membrane deep brown or fuscous; wings subhyaline, fumate on the apical half, 3 teeth in the tarsal claw; 5–5.5 mm. long. ♀.

Montana; five specimens.

Digitized by Google

HOLOPYGA Dahlbom.

Hym. Eur. ii, 47, pl. iii, 1854.

Evenly and closely punctured all over, largest on metathorax, smallest on the occiput and the abdomen; 2–4 distinct teeth between the base and apex of tarsal claw.

This genus is allied to *Hedychrum* and *Hedychridium* in the distribution of the punctures and the character given by the general appearance, but it is equally allied to *Omalus*, *Elampus* and *Notozus* in the toothed tarsal claws and its tendency to vary in the number of these teeth. By its intermediate characters it seemingly prevents the separation of these two groups of genera into sub-families.

Three or four teeth within the tarsal claw, the intervals between the abdominal punctures smooth..... **ventralis.**

Two teeth within the tarsal claw, the interval between the abdominal punctures with fine shallow punctures..... **horus.**

Holopyga ventralis.

Hedychrum ventrale Say, Long's second expedition, App. 330, 1824.
Holopyga compacta Cresson, Proc. Ent. Soc. Phila., iv, 304.
Hedychrum violaceum Provancher, Nat. Can. xii, 301.
Holopyga ventralis Norton, Trans. Am. Ent. Soc. vii, 235.

Before me are seventy-six specimens, all with 3 or 4 teeth in the claw, among which are several specimens determined by Mr. Norton as this species, and the type specimen of Mr. Cresson's *H. compacta;* the others are from Georgia, Illinois, Montana, Washington Territory, Colorado, California, Texas and Vancouver's Island. Among these are several well marked varieties, but the characters separating them are in no case constant, and the connecting links are numerous and gradational. These characters are as follows: bright emerald-green all over with brassy reflections, without blue or purple, to dark blue and purple with slight green reflections, and all intermediate shades; lateral margins of third abdominal segment with two slight arcuations, in others the lobe is wanting and the margins with one long arcuation (also gradational); apex of third segment with a broad shallow notch, in others wanting, the apex rounded, and in most of the specimens the notch is slight and gradational. In some few specimens the entire margin of third segment is straight and even. There is also a gradation between the third and fourth toothed claws; 4.5–7 mm. long.

Holopyga horus n. sp.—Dark green with some blue and purple, or light blue with much green and a little purple; a slight arcuation at apex of third segment; one specimen has the lateral margin slightly angulated, the others with the margin with one long arcuation, not angulated; 4.5 mm. long. ♂. ♀.

Montana and Nevada; four specimens.

Digitized by Google

HEDYCHRIDIUM Abeille de Perrin.

Ann. Soc. Linn. de Lyon, 26, p. 35, 1879.

Between *Holopyga* and *Hedychrum* on account of the punctured area below postscutellum and the somewhat intermediate character of the teeth of the tarsal claws, viz.: one small tooth in the middle of claw; punctures, appearance, etc., much as in these two allied genera.

A triangular punctured area below the postscutellum ending in a short median ridge, foveolæ on each side diagonal.

Pro- and mesothorax with close punctures, all of about equal and medium size; postscutellum continuing into the area and not divided from it except by a slight projection. As viewed laterally the apex of the second segment is raised considerably above the base of the third segment...**dimidiatum.**

Pro- and mesothorax with close fine punctures interspersed with sparse, large, shallow punctures; postscutellum somewhat divided by its margin from the area. As viewed laterally the apex of the second segment is nearly even with the base of the third.....**viride.**

Postscutellum connected directly with a median ridge on the metanotum; foveolæ on each side transverse, striated.....**cæruleum.**

Hedychridium dimidiatum.

Hedychrum dimidiatum Say, Long's second expedition ii, 331, 1824; Norton, Trans. Am. Ent. Soc. vii, 237.

Thirteen specimens from Delaware, Illinois, Virginia, Colorado, So. California, Montana and Washington Territory. The five Eastern specimens all have a decided bluish shade, with as much green and some purple reflections. The Western specimens have a decided green color with less blue and some purple; dorsum of abdomen in some specimens dull blackish, purple, the same shade of color as across the extreme base of the segments beneath the overlaping of the preceding segments. One specimen is entirely emerald-green with brassy reflections, no blue, and a touch of golden on the scutellum. On the metanotum, below and contiguous to the postscutellum, a small, triangular, punctured area, pointed below and continuing into a median ridge above the extreme base of the abdomen. On each side of this triangular, punctured area are long, shallow, diagonal foveolæ, roughened, or with substriæ, and generally of a darker color.

Hedychridium viride.

Hedychrum viride Cresson, Proc. Ent. Soc. Phila., iv, 306, 1865; Norton, Trans. Am. Ent. Soc. vii, 238.

Thirty-nine specimens from Colorado (the types), Montana, Dakota, Washington Territory, California and Utah. The color is generally emerald-green with brassy reflections; in some specimens the abdomen is darker with blue reflections, in others the blue is predominating with

Digitized by Google

purple and green reflections; very closely allied to *dimidiatum;* differs in having the margin of the postscutellum dividing it from the following punctured area on the metanotum, in the punctures, and in the base of the third segment being nearly even with the apex of the second. In some specimens the third segment is subconical, but this character, together with the striated basin of face and the density of the abdominal punctures is inconstant, and in some specimens one or more of these characters approach *dimidiatum.*

Hedychridium cæruleum.

Hedychrum cæruleum Norton, Trans. Am. Ent. Soc. vii, 239, 1879.

Two specimens from Dakota and Montana. The type is dark blue with green and blue on the thorax, mostly purple on the abdomen, the other is lighter blue with much green and little purple. On the metanotum, below and connected with the postscutellum, a median ridge, on each side of which is a branching transverse ridge directed towards the metasternal spines. Between the transverse ridges and the posterior margin of the postscutellum are longitudinal striæ, longer laterally, and below these, on each side of the median ridge, a triangular, slightly roughened space.

HEDYCHRUM Latreille.

Hist. Nat. Cr. et. Ins. 1804.

Occiput pro- and mesothorax with smoothed areas and sparse punctures. **obsoletum.**

No smoothed areas, strongly and closely punctured all over the head and thorax.

Dorsum of thorax coppery red (or golden and green with red reflections in some specimens), contrasting with the head, metanotum, legs and abdomen, which are green or blue..... **cupricolle.**

Dorsum of thorax about uniform in color, from blue and purple to emerald-green, not contrasting with the other parts, and if inclining to coppery or golden, the other parts have bright brassy or golden reflections.

As viewed posteriorly the postscutellum is rounded and connects with a median ridge on the metanotum; the metanotal spines have the excavation at the base anterior to the black foveolæ with cross striæ (a great variation in size, color and other minor characters, is represented in this species. See description)..... **violaceum.**

As viewed posteriorly the postscutellum is followed by or extended into a punctured area on the metanotum, which takes the place of the median ridge; the metanotal spines have foveolæ or punctures at the base anterior to the black foveolæ; not striated..... **continuum.**

Hedychrum obsoletum Say, Boston Journal i, 284, 1835; Norton, Trans. Am. Ent. Soc. vii, 237.

H. Zimmermanni Dahlb., Hym. Eur. ii, 61, 1882.

Four specimens from Illinois and Pennsylvania (Iowa, Say). Front closely and vertex loosely punctured, green; occiput pro- and mesothorax polished with small, very sparse punctures, purple and blue; sides and

Digitized by Google

metathorax green, with large, shallow, close punctures; postscutellum followed by or extended into a small punctured area on the metanotum, which in turn ends in a median ridge; foveolæ at sides triangular and with the extreme base of spines transversely striated; abdomen polished, very finely and sparsely punctured, deep blue and violaceous purple, with slight crimson reflections in certain lights. A very distinct species on account of the lack of punctures on certain portions; 5.5 mm. long.

Hedychrum cupricolle Cresson, Proc. Ent. Soc. Phila. iv, 305, 1865.

Three specimens from Colorado (two of which are Mr. Cresson's types). Densely and rather finely punctured on the head and thorax, excepting the scutellum and postscutellum, which have the punctures larger; abdomen with the punctures a little separated, but on some portions becoming contiguous. In the types the head, sides, legs, metanotum and abdomen are emerald-green with a little blue, the entire dorsum of thorax bright coppery red, the postscutellum a little green; 7.5 mm. long. In the other specimen the median lobe of mesothorax alone coppery red, the other portions of dorsum of thorax bright golden and emerald-green with coppery reflections; front green, sides green and blue, metanotum purple and blue; occiput, legs and abdomen blue, purple and green; 6 mm. long.

Hedychrum violaceum.

Form VIOLACEUM.

Hedychrum violaceum Brullé, Hist. Nat. des Ins. Hym. iv, 51; Norton, Trans. Am. Ent. Soc. vii, 238.

Hedychrum asperum Brullé, loc. cit. p. 52; Norton, loc. cit.

Form WILTII.

Hedychrum Wiltii Cresson, Proc. Ent. Soc. Phila. iv, 305; Norton, loc. cit. p. 237.

Hedychrum Louisianæ Norton, loc. cit.

Form PARVUM; new.

I have before me seventy-eight examples of this species, among which are Mr. Cresson's type of *Wiltii*, Mr. Norton's type of *Louisianæ*, and his determinations of *violaceum* and *asperum*, which are undoubtedly correct. The variation in size of the races of this species is most remarkable, and relatively to the named forms is as follows: *Wiltii*, 13.5–10.5 mm. Kansas, Nebraska, Colorado; *Louisianæ*, 10.5–8 mm. Louisiana, Georgia, Texas, Colorado, Washington Territory; *Violaceum*, 8–7 mm. Virginia, Montana, Washington Territory, Mexico; *Asperum*, 7–5 mm. Canada, Maine, New Hampshire, Pennsylvania, New Jersey, Delaware, Virginia, Georgia, Montana, Dakota, Washington Territory, Colorado, California, Vancouver's Island, Mexico; *Parvum*, 5–4 mm. long, from Montana.

Digitized by Google

It will be seen from the above that the localities have nothing to do with the establishment of varieties, and even the forms here given, founded only on relative size, are of little or no value, simply because the gradation throughout is equal and absolutely intact. *Violaceum* (= asperum) is the medium and representative form. Other slight variations are noticeable, which take place entirely irrespective of size or locality, these are the posterior margin of postscutellum being uneven, or rather broken, larger or smaller abdominal punctures, a polished space down the middle of first and second segments, sinuated or angulated margin of third segment, etc. The color also varies in all the forms from emerald-green with brassy reflections to deep blue and purple and very little green. The North-eastern specimens are all dark blue with purple and green, with one exception from Canada (Provancher's collection), which is dark green with a little blue. In the Southern and Western specimens those with dark green and little blue predominate with the blue specimens from every locality. The student will at first readily separate *Wiltii* from the other forms in his collection, and he will not be able to comprehend its proper relation to them without a large series to show the inconstancy of characters, it appears so remarkably different. There was, seemingly, good reason for Mr. Cresson to describe *Wiltii* as distinct from *violaceum*, its then only described ally, as it is twice the size apparently. On the other hand there is no difference between the type of *Wiltii* and the type of *Louisianiæ*, except the latter being 3 mm. shorter and of a dark green and blue instead of blue and purple and green. The character in Mr. Norton's key as separating these two as species is not a correct one. *Wiltii* should come under the same heading as *Louisianiæ*, viz.: "postscutellum connecting abruptly with the short dividing ridge of the metathorax."

Provancher's *violaceum* is *Holopyga ventralis* Say.

Hedychrum continuum n. sp.—One specimen emerald-green with brassy reflections and no blue, one specimen with the thorax green and blue, the abdomen blue and purple, three specimens darker green with brassy reflections and more or less blue, and another almost entirely dull purple, a little blue on the abdomen, closely punctured on the thorax; abdomen with the larger punctures rather separated, with smaller punctures between, appearing roughened in some specimens; posterior portion of the metanotum below the postscutellum evenly and finely punctured, no median dividing ridge, the postscutellum slightly overhangs the metanotum. In the emerald-green specimen the narrow, smoothed margin of the postscutellum continues around its apex, dividing it from the punctured metanotum; lateral margins of the third abdominal segment straight; apex with a broad, shallow sinus in some specimens; 3-4 mm. long. ♂ ♀.

Nevada, California, Washington Territory; six specimens.

Digitized by Google

Sub-family—CHRYSIDINÆ.

Head as broad, or broader than the postscutellum; space between the eyes on the face as wide as the distance between the base of antennæ and the vertex; the carina transverse, not forming a basin on the vertex; postscutellum rounded posteriorly; first abdominal segment rounded, not carinated on the sides; second segment about twice as long on the dorsum as on the sides, its posterior margin about straight in the middle, convex laterally..... .....**Chrysis.**

Head small, much narrower than the postscutellum; space between the eyes, on the face, narrow, not half as wide as the distance between the base of antennæ and the vertex; the carina extended upward, surrounding the anterior ocellus, forming the margins of a distinct basin, much in shape of a horseshoe; postscutellum partly hidden, projecting into a subconical piece, which is strongly excavated; first abdominal segment flattened on the sides, causing a short, oblique carina above; second segment more than three times as long on the dorsum as on the sides, its posterior margin greatly convex equally.....**Stilbum.**

CHRYSIS Linné.

Syst. Nat. ed. xii, vol. i, p. 947, 1767.

In this genus the differences in the form of the apical margin of the third abdominal segment seems to be only of *subgeneric* importance as subordinate to the generic distinction. *Five* and *seven* dentate forms are represented by certain exotic species. *Chrysis amœna* Eversm., belonging to the former, is described and figured by Radaskovsky in Horæ Soc. Ent. Ross. iii, 295, and Frederic Smith has described species with five and seven teeth in Trans. Ent. Soc. London, 1874, 460–462. I have examined specimens from Africa of the allied genus *Pyria*, of which so far we have no representative in North America.

Our subgenera are thus characterized:—

Apical margin of abdomen entire.....**A.**
" " notched.....**B.**
" " unidentate (unilobed).....**C.**
" " tridentate.....**D.**
" " bidentate.....**E.**
" " quadridentate.....**F.**
" " sexdentate.....**G.**

A.—Apical margin of abdomen *entire.*

Abdomen dark red, with green, purple and golden reflections.....**martia.**
Abdomen colored as the thorax, green, or blue and purple.
Posterior corners of the margin of third segment rounded, even, not produced.
An arched carina across the front of the head immediately above the basin of face, which is striated.....**verticalis.**
Front without carina, basin of face punctured.
Posterior lateral angles of the metathorax subobtuse, not produced.

Digitized by Google

Margin of third segment evenly rounded.....**inusitata.**
Margins of third segment straight laterally and on the apex, broadly rounded on the angles, much tapered.....**optima.**
Posterior lateral angles of the metathorax more or less produced or pointed.
Anteapical series of pits contained at the bottom of a strong declivity ending on each side near the base of the segment.....**pacifica.**
Anteapical series of pits contained in a broad, shallow groove or sulcus, becoming obsolete laterally and ending not half way to the base of segment.
Apical margin of third segment straight, or slightly rounded outwardly. **hilaris.**
Apical margin of third segment slightly sinuate in the middle. **integra.**
Posterior corners of the margins of third segment angulated, produced.
Corners produced but slightly into a rounded lobe, series of pits small, ending about in the middle of the lateral margins.....**cobaltina.**
Corners produced into a well defined triangular tooth bluntly pointed, the series of pits large, ending near the base of the segment. **lateri-dentata.**

Chrysis martia Patton, Can. Ent. xi, 67, 1879.

"Head and thorax green; abdomen dark red with green and purple reflections; head and thorax densely and strongly punctured, no transverse ridge between the eyes; prothorax with a median groove; postscutellum and metathorax evenly rounded above; abdomen densely punctured, the punctures finer than those of the thorax; the series of foveolæ on the third segment consisting of twelve deep punctures, the median ones the largest; second and third segments of equal length, the third segment narrowed a little beyond the foveolæ and produced in the centre, the tip truncate, of more than one-third the width of the segment, not dentate; wings hyaline; 5 mm. long. Godbout River, Lower Canada."

From the description of Patton; the insect is unknown to me. Without being able to examine the peculiar character of the apical margin as described, it becomes rather puzzling. I have placed the species in the group with the margin entire, but very doubtfully, however, as it may belong to the *unilobed* group. I have also placed it before *verticalis*, not intending, however, to indicate its correct position.

Chrysis verticalis Patton, Can. Ent. xi, 67, April, 1879.
Chrysis striatellus Norton, Trans. Am. Ent. Soc. vii, 239, May, 1879.

Fifteen specimens in the collection from the following localities: Massachusetts, Delaware, Virginia, Illinois (types of *striatellus*), New Hampshire, Georgia, Colorado, Washington Territory and California. Norton also mentions Pennsylvania. Varies from bright green with blue reflections to dull blue and purple. The dorsum of the abdomen in many specimens is dull, with the reflections darker than the general color. In some specimens the dorsum is dull black with very slight reflections. The head is much longer than is generally the case in the species of the genus; 4–6 mm. long.

Digitized by Google

Chrysis inusitata n. sp.—Bright emerald-green with brassy and slight golden reflections. Very densely punctured all over, the punctures on the head and thorax of two sizes, the larger ones sparse, the finer punctures entirely filling up the intermediate spaces, largest on dorsum of metathorax, very fine on the metanotum; face punctured, obliquely and very slightly striated just above the base of antennæ; abdomen with the punctures dense, equal, fine on the dorsum; wings hyaline, subfuscous on the radial cellule; postlateral spines of the metanotum abbreviated, subobtuse, not produced; apical margin of the third abdominal segment evenly rounded; pits small, contained in a shallow groove; 8.5 mm. long. (♀ ?)

Vancouver's Island, California; two specimens.

Chrysis optima n. sp.—Bright green and blue, one specimen emerald-green; densely punctured, the punctures on the head and thorax of two sizes, the larger ones separated, the smaller closely filling up the spaces between, largest on the scutellum and postscutellum, fine on the metanotum; the posterior lateral angles of the metanotum, abbreviated, obtuse; face punctured with very fine, oblique striæ just above the base of antennæ; abdomen densely and about equally punctured; third segment with margins rounded unequally, narrowed at the apex, the ovipositor projecting and showing a metallic green color; the pits rather separated, contained in a broad shallow groove; wings hyaline, slightly infuscated on the disc; 8 mm. ♀.

California; three specimens.

Chrysis pacifica Say, Macl. Lyc. i, 82, 1828; Norton, Trans. Am. Ent. Soc. vii, 240.

Seventeen specimens in the collection with the following localities represented: New York, Delaware (Norton's types), North Carolina, Texas, Colorado, Washington Territory, California and Labrador. This is undoubtedly Say's species. One specimen emerald-green with brassy and some golden reflections, the others are green and blue, with slight variation as to depth of color. Some specimens with a slightly smoothed space down the middle of the face; densely punctured, large and equal on the head and thorax, of two sizes on the abdomen, the larger ones separated, the finer punctures rather close; pits rather large, oblong, contained in a strong groove; varies greatly from 6–12 mm. in length. Both males and females.

Chrysis hilaris Dahlbom, Hym. Eur. ii, p. 103, 1854; Norton, Trans. Am. Ent. Soc. vii, 239.

Chrysis halictula Gribodo, Ann. Mus. Senov. vi, p. 359, 1875.

Four specimens from the localities: Canada, Illinois, Washington Territory and California (Connecticut, Norton). Varies from emerald-green to blue, purple and green; basin of face punctured; head and thorax densely punctured, large and equal, a little separated on the prothorax, with a few fine punctures between; finer and subequal on the abdomen (of two sizes according to Norton's description); apex of the

Digitized by Google

second segment almost smooth; 5.5–8 mm. long. Gribodo's *halictula* does not differ; his description is as follows (the notes in brackets are mine): "Related to *C. hilaris* Dahlb., but distinguished from it in the following characters: antennæ filiform, articles not swelling (varies in *hilaris*), posterior margin of pronotum and sides not abnormal (not abnormal in *hilaris*), third segment of abdomen conspicuously narrower at apex than at base (also decidedly the case in *hilaris*), anteapical series moderately abrupt (small, but distinct in *hilaris*, this is probably what is meant by abrupt), length of body 6 mm. Habitat, California."

Gribodo has incorrectly determined *hilaris*, for Dahlbom's description reads: "metanoti anguli postico-laterales magni conici."

Chrysis tota Aaron.

Chrysis integra (name preoccupied) Cresson, Proc. Ent. Soc. Phila. iv, 306, 1865; Norton, Trans. Am. Ent. Soc. vii, 240.

Six specimens in the collection, including the type, all from Colorado; color is emerald-green all over with brassy reflections and very little blue; head and thorax covered with comparatively long fuscous pubescence; head, thorax and lateral surface of abdomen with the larger punctures sparse, the intermediate spaces filled up with close, fine punctures; 10–12 mm. long. The var. a. ♀ of Norton is the following species. The name *integra* has been used by Fabricius (Syst. Ent. ii, 241) for a species found in Africa.

Chrysis cobaltina n. sp.

Chrysis integra var. a. ♀. Norton, Trans. Am. Ent. Soc. vii, 240.

Elegant blue with some green and very slight purple reflections; head with dense fuscous pubescence, shorter and less dense on the thorax; head and thorax densely punctured, on the prothorax with some finer punctures between the larger ones; punctures on abdomen less dense, those on the first and second segments shallow, the larger ones sparse, and with separated finer punctures on the intermediate spaces, those on the third segment contiguous, subequal; apical margin of third segment very slightly sinuate in the middle, the lateral posterior corners distinctly but slightly produced or lobed; pits small, shallow, rather close, contained in a shallow groove, which ends about midway on the lateral margin; wings hyaline, the basal half infuscated, the radial cell darkest; tarsi fuscous; 9 mm. long. ♀.

Massachusetts; one specimen. This is probably the typical specimen of Norton's var. a. ♀ of *integra*.

Chrysis lateri-dentata n. sp.—Rather dull, light green, with some brassy reflections; head and thorax closely punctured, the punctures not large, subequal; abdomen with the first and second segments densely punctured, the larger ones separated, the spaces between them filled up with finer punctures of several sizes; third segment with the punctures smaller, contiguous, subequal; apical margin nearly straight, the lateral posterior corners each produced into a

Digitized by Google

distinct pointed tooth; pits medium, contained in a deep groove, which ends on the lateral margin near the base of the segment; wings hyaline, basal half infuscated; tarsi light brown; 9 mm. long.

Montana and Washington Territory; three specimens, all ♀.

Differs from *cobaltina* in having little or no pubescence on the head and thorax, in the pits and grooves, in the lateral apical teeth and by the larger punctures on abdomen being deeper.

B.—Apical margin of abdomen *notched*.

Basin of face cross striated, lateral margins of third segment bisinuate, or nearly straight.

Abdomen blue or green, colored as the thorax or head.....**perpulchra.**

Abdomen elegant metallic scarlet and gold (or cupreous), head and thorax blue and green.....**facets.**

Basin of face finely punctured, lateral margins of third segment distinctly angulated, the angles a little produced.....**densa.**

Chrysis perpulchra Cresson, Proc. Ent. Soc. Phila. iv, 308, 1865; Norton, Trans. Am. Ent. Soc. vii, 241.

Twenty-seven specimens in the collection from the localities: Canada, Delaware, North Carolina, Georgia, Colorado (the type), Utah, Nevada, California, New Mexico, Montana, Washington Territory and Vancouver's Island. There are variations in color from deep blue and little green with some purple, to emerald-green with no blue or purple. Some specimens have the upward continuation of the carina strong, enclosing the anterior ocellus; others having this continuation almost wanting. The notch in the middle of the apical margin of third segment varies in size and depth, and the lateral margins are in some specimens straight, in others slightly sinuate; length from 6–8 mm.

Chrysis facets n. sp.—Head and thorax blue with green reflections, closely covered with equal punctures; basin of face striated, on each side covered with white pubescence; carina extending upwards and almost surrounding the anterior ocellus. On each side of the occiput above and behind and touching the eye, a rounded, strongly convex, smooth space, blue, and two others similar, but smaller, and each with a brassy and green reflection, just behind and touching the posterior ocelli; abdomen golden and cupreous, with elegant ruby reflections, in great contrast to the thorax, a faint green reflection at the base of the first segment and the apical margin beyond the pits, green; sutures black, shining, when exposed; the punctures are as large as those of the thorax, but less dense, except on the immediate dorsum; apical margin of third segment deeply notched in the middle, on each side of the notch the margin is pointed; lateral margins very broadly but slightly sinuate or arched inwardly; pits medium, close, contained in a strong groove, which runs parallel to the lateral margins and ends near the base of the segment; wings hyaline, very slightly infuscated on a part of the radial cellule: tarsi fuscous; 4.5 mm. long. ♀ (?).

Digitized by Google

Colorado; one specimen. The character of the convex lobes on the occiput is very odd, and does not appear in any other species of the family with which I am acquainted.

Chrysis densa Cresson, Proc. Ent. Soc. Phila. iv, 307, 1865; Norton, Trans. Am. Ent. Soc. vii, 241.

Eleven specimens from Colorado and California, including Mr. Cresson's type specimens. The color varies from light blue with much green and slight purple reflections to emerald-green with very little blue and no purple; wings almost clear hyaline in one specimen, in the others subflavescent to a more or less degree; very densely and almost equally punctured all over. There is a great variation in the margins of the third abdominal segment, in that the angle of the posterior and lateral margins is in some specimens over 160°, while in others it is less than 140°. In the latter the posterior margin is much less extended at the apex, and the segment appears quadrate, and the margin between the lateral angles and the notch is arched a little outwardly or straight, while in the former the apical margin is extended in the middle, and between the notch and angles is arched inwardly. The grades exist. This species approaches nearest the bidentate species, and through the development of the lateral angles into teeth, and the lobes on each side of the notch into extended points or teeth, probably represents the ancestral form of the bidentate and quadridentate species.

C.—Apical margin of the abdomen unidentate (*unilobed*).

Chrysis discreta n. sp.—Head and thorax emerald-green with slight blue reflections, evenly punctured, the punctures a little separated; basin of face cross striated, front carinated, the carina on each side continued upwardly and nearly surrounding the anterior ocellus; prothorax not so long as the head; postscutellum very slightly produced, as in the tridentate species; metanotal spines produced, a little curved, bluntly pointed; abdomen emerald-green with the basal two-thirds of the second segment, broadly on the dorsum, rich blue and purple; punctures equal, even, a little more separated than on the thorax; third segment much narrower at the apex, the lateral margins a little sinuate on each side of the central, slightly produced, rounded lobe; pits medium, close, contained in a strong groove, which ends on each side a little behind the junction of the apical and lateral margins, and which is divided in the middle by a very distinct ridge across the pits reaching the apical lobe; wings slightly infumated, tarsi fuscous; length 4.5 mm. long. ♀.

North Carolina; one specimen. This species belongs to the same group as the Old World species *Leachii* and *succinctula*, but is very distinct from them on account of the blue and green abdomen.

Digitized by Google

D.—Apical margin of abdomen *tridentate.*

Postscutellum rounded posteriorly, not produced.....**Doriae.**
Postscutellum conical, produced posteriorly.....**parvula.**

Chrysis Doriae Gribodo, Ann. Mus. Genov. vi, p. 359, 1875.—"Similar to *C. cyanea* L., as to character (?), but is readily distinguished by its entire anus; slender green-blue, somewhat shining; head and thorax somewhat thickly punctured; abdomen sparsely and moderately punctured: third segment distinctly narrower at the apex than at the base, curved, subtruncate; anteapical series moderately abrupt, distinctly interrupted in the middle, foveolæ obliterated. Length of body 4.5 mm. Habitat Boreal America."

Translated from Gribodo's description. The collection does not contain this species. The character given in the above table for *C. Doriae* is taken from Dahlbom's table as relates to *C. cyanea*, viz.: "Postscutellum muticum," and is assumed for this species because Gribodo's description reads "similar to *C. cyanea*," with no difference as to the postscutellum mentioned.

Chrysis parvula Fabr., Syst. Piez. 176, 1804; Dahlb., Hym. Eur. ii, 191, tab. x, 106; Norton, Trans. Am. Ent. Soc. vii, 242.
Chrysis carinata Say, Ann. Macl. Lyc. i, 82, 1828.
Chrysis tridens Lep. et Serv. Encycl. x, 495, Pyria; Brullé, Nat. Hist. des Ins. Hym. iv, 46, 1846.
Chrysis mucronata Brullé, loc. cit. 45, 1846; Norton, Trans. Am. Ent. Soc. vii, 242.
Chrysis 3-*dentata* Dahlb., Dispos. 15, 22, 1845.
Chrysis virens Cresson, Proc. Ent. Soc. Phila. iv, 309, 1865.

The forms of *parvula* and *mucronata* have no constant characters to separate them. The carina across the front is sometimes entirely without the upward branches, and there is every intermediate form between this and two strong branching carina on each side, one near the anterior ocellus. Other specimens have the inner carina strong, the outer hardly present. There is also no difference in the projection of the metathorax as mentioned by Brullé. There is a considerable variation in the relative size of the apical teeth, the outer ones in some specimens being only sharp angles of 100° and the median tooth short, while in others the outer teeth are well produced and the median one long and slender, sometimes a little bent down; also all forms between these extremes. The color is from dark blue with purple and some green reflections to emerald-green with no blue or purple. The anteapical series of pits differ in size and shape. Varies in size from 7–11 mm. United States and Mexico. In all fifty-three specimens, including the type of *virens* Cresson, which does not differ.

Digitized by Google

E.—Apical margin of abdomen *bidentate.*

Abdomen colored like thorax, emerald-green.....**scitula.**
Abdomen cupreous, scarlet and gold, thorax blue and green.....**aurichalcea.**

Chrysis scitula Cresson, Proc. Ent. Soc. Phila. iv, 309, 1865; Norton, Trans. Am. Ent. Soc. vii, 242.

One specimen (the type) from Colorado. It is emerald-green with some brassy reflections; punctures about equal all over, dense on the head and prothorax, less dense on the metathorax; a little separated on the first and second segments of the abdomen, very dense and indistinct on the third segment. The apex of the third segment contains two distinct teeth, separated by a rounded emargination, and on each side of these teeth is a broader sinuation separating the distinct lateral angles from the apical teeth. This is, though less fully developed, the exact pattern of the normal 4-dentate species; pits small, rounded, rather close, contained in a shallow groove; deeper laterally; 6 mm. long. The specimen is a ♀.

Chrysis aurichalcea Prov. Nat. Can. xii, 300, 1881.

Before me are three specimens, one of which is Provancher's type from Canada, the others from Maine and Canada; the head and thorax in the two Canadian specimens blue with much green and purple, the Maine specimen with the predominating color green, with some blue and purple reflections. In all densely punctured, finest on the head; basin of face broadly smooth; abdomen in the Canadian specimens cupreous and golden, with brilliant emerald-green reflections in certain lights; in the Maine specimen cupreous with deep scarlet or ruby reflections, almost entirely ruby on the dorsum, with green reflections only at the base of first segment and on the apical margin beyond the pits; abdominal punctures on first and second segments equal, close, very little separated, becoming irregular laterally, and confluent and irregular on the third segment; pits medium, rounded, subequidistant, contained in a shallow groove ending midway on the lateral margin; lateral angles and apical teeth as in *scitula;* 7–7.5 mm. long. All females.

F.—Apical margin of abdomen *quadridentate.*

Prothorax much *shorter* than the head (plate x, fig. 88).
As seen from the side the lateral margins of third segment are bisinuate, slightly near the middle and distinctly just before the outer teeth.
Emerald-green, golden and cupreous.....**Meta.**
From dark blue and purple to emerald-green, with nothing more than brassy reflections.

Digitized by Google

Basin of face smooth (more largely just below the cross carina), anterior margin of the groove containing the pits of third segment straight; pits normal rounded.

Median teeth short, stout and rounded..... **dorsalis.**

Median teeth long, slender and pointed..... **montana.**

Basin of face striate, anterior margin of the groove containing the pits of third segment arched inwardly by the increased size of the median pits..... **Frey-Gessneri.**

Basin of face finely punctured.

Each side of the face covered with long white hairs; as seen from the side the outer apical teeth are long and slender and decidedly turned down..... **hirsuta.**

No long white hairs covering the face; the outer apical teeth as seen from the side are abrupt, triangular and projecting in a line with the lateral margin.

Median teeth closer together than the median and outer teeth; outer teeth, hardly projecting, about six or eight distinct large semi-transparent luteous pits, forming a deep broad groove..... **pelucidula.**

Median teeth farther apart than the median and outer teeth; outer teeth rather strong, about ten or twelve indistinct medium pits, not apparently semi-transparent..... **Pattoni.**

As seen from the side the lateral margins of third segment are straight, or slightly arched inwardly.

Basin of face striate..... **venusta.**

Basin of face punctured.

Median teeth separated by a shallow, evenly curved arcuation, farther apart than the median and outer teeth..... **nitidula.**

Teeth, and the emarginations between them, subequal, or with the median teeth separated by a deeper rounded emargination and nearer together than the median and outer teeth..... **cærulans.**

As seen from the side the lateral margins of the third segment are sinuate, or arcuate, just before the outer apical teeth.

Anterior margin of the groove containing the pits abrupt, forming a distinct swelling or declivity, and as seen from above the apical portion of segment with its lateral margins nearly parallel, very far within the overhanging margins of the groove..... **inflata.**

Anterior margin of the groove rising only slightly above the pits, and as seen from above the apical portion of segment with its lateral margins connivent, nearly equal with the lateral margins of the basal portion. **Nortoni.**

As seen from the side the lateral margins of the third segment are arched outwardly, nearly straight just before the outer apical tooth. **peracuta.**

Prothorax as long, or longer than the head (plate x, fig. 89).

Lateral margins of the third segment straight..... **tripartita.**

Lateral margins of third segment bisinuate.

Teeth tolerably long and slender, pointed, the median much longer than the outer..... **propria.**

Teeth short, rounded at the apices, subequal..... **lauta.**

Digitized by Google

Chrysis Meta n. sp.—Varies from emerald-green with brassy reflections, and slight golden reflections on the abdomen to golden and green with strong cupreous reflections, deepest on the abdomen; head and thorax closely and equally punctured, finest on the head; basin of face broadly smooth; abdomen with the punctures of the first and second segments somewhat separated but evenly distributed, with finer punctures scattered among the others; specimens with the abdomen deep cupreous have the sutures, when exposed, black, and a patch on basal half of dorsum of second segment black, shading to green, the punctures within it green; third segment with the punctures larger, a little confluent; apical margin beyond the pits in all the specimens black; pits rather large or medium, distinct or confluent, rounded or oval, contained in a shallow groove, which ends midway on the lateral margin; wings hyaline, very slightly infumated at the base of the radial cell; 6–7 mm. long. ♂ ♀.

Montana; twelve specimens. A very beautiful and distinct species.

Chrysis dorsalis n. sp.—From dark blue, purple and green, to emerald-green and no purple; head and thorax closely and equally punctured; basin of face smooth in the middle, very finely punctured on each side; abdomen closely and about equally punctured, the punctures becoming a little confluent and slightly larger on the apical half of third segment; on the basal three-fourths of the dorsum of each segment of a deeper and duller color, black in the green specimens, purplish black in the blue; pits medium, or a little large, round, separated, contained in a shallow groove, which ends midway on the lateral margin; some specimens differ from the figure (plate 9) by having the median teeth as far apart as the median and outer teeth, and somewhat pointed; wings hyaline, infumated on the basal half, in one specimen fusco-flavescent; 6–7 mm. long.

Colorado, California, Washington Territory, Montana and Vancouver's Island; ten specimens.

Chrysis montana n. sp.—Blue with emerald-green to emerald-green with a little blue; head and thorax closely and evenly punctured; basin of face smooth, punctured on each side; abdomen with the punctures very little separated, almost as close as on the thorax, larger on the sides and towards the apex of third segment; pits large, shallow, slightly separated, forming a large, distinct, though shallow groove, which extends midway on the lateral margin; wings almost clear hyaline; 6 mm. ♀.

Montana; two specimens.

Chrysis Frey-Gessneri Gribodo, Ann. Mus. Genov. xiv, p. 333, 1879.

Three specimens from New York, Texas and Washington Territory. Gribodo's description is as follows:

"Of moderate size, slender, cylindrical, not very bright, obscurely green; head and thorax very densely and irregularly punctured and subcoriaceous (scutellum and postscutellum punctured and reticulated); abdomen closely and regularly punctured; head, viewed in front, rounded, quadrate; facial cavity large, not deep, margined above and at the sides; postscutellum rather flat and sloping; abdomen nearly as broad at apex as at base, a little longer than head and thorax together; third segment entirely uniformly convex on all sides, *i.e.* the anteapical series entirely wanting, and the anal area not immersed, but on the contrary forming in the same position a very large and deep erose fovea, interrupted in the

Digitized by Google

middle, and conspicuously biarcuate; anal margin quadridentate, the robust teeth prolonged, acutely triangular subequal, emargination arcuate, equal; wings slightly sordid, perfectly hyaline on the limb. Length 7 mm. Texas."

Varies from 7–8.5 mm. The color is emerald-green with some blue reflections; basin of face very finely and narrowly striate. Gribodo is hardly correct and a little difficult to understand when he says: "anteapical series entirely wanting," but farther on he explains, "forming in the same position a very large and deep erose fovea," which means in the same position as the anteapical series of pits. This fovea, which being "interrupted in the middle," forming two, is nothing more than the two median pits greatly enlarged, becoming confluent with the others and disturbing the evenness of the posterior margin of basal area of segment, causing it to be arched. The size of these large pits, however, varies, and in one specimen hardly cuts the before mentioned margin. The apical teeth also vary in length.

Chrysis hirsuta n. sp.—One specimen deep blue with dull purple reflections, the other green and blue with black and dull purple on the dorsum of the second abdominal segment; head, thorax and abdomen densely and equally punctured; in one specimen the punctures on the dorsum of the second segment becoming largely confluent, or running together in rows; basin of face finely punctured on each side (best seen in certain directions and light) with long coarse white hairs; pits very large and confluent in a rather deep groove, which ends midway on the lateral margin; teeth unusually long and slender and much turned down; wings clear hyaline; 4.5–6 mm. ♂ ♀.

Montana and Utah; two specimens.

Chrysis pellucidula n. sp.—Green and blue, deep purple and black on the dorsum of the second abdominal segment and a little deeper blue on the first segment; basin of face punctured; head and thorax densely and equally punctured; abdomen with the punctures separated, especially so in the second segment, closer and a little confluent on the sides of the third segment; pits very large, confluent, luteous and when held towards the light somewhat transparent; the median separation very narrow; apical margin abrupt, sharp; teeth coming to sharp points; wings hyaline, very slightly infumated; 5.5 mm. ♀.

Virginia; one specimen.

Chrysis Pattoni n. sp.—Emerald-green with blue reflections; basin of face punctured; head and thorax with the punctures rather fine, dense and equally distributed; abdominal punctures hardly separated, about equal, close and a little confluent on the third segment; pits medium, rather indistinct, dark colored, the groove moderate, ending near the base of segment; a little raised above the pits on its anterior border at the extreme dorsum; apical margin not very abrupt; wings rather strongly infumated nearly to the apex; 6 mm. ♀.

Colorado; one specimen. The figure gives only the lateral view of third segment; as seen from above it exactly resembles fig. 64, same plate.

Digitized by Google

Chrysis venusta Cresson, Proc. Ent. Soc. Phila. iv, 311, 1865.

Three specimens in the collection from Colorado (the type), Arizona and Texas. One specimen with the first abdominal segment partly and the second with all but a narrow space on the posterior margin showing black, with a faint tinge of purple; the teeth vary; plate ix, fig, 61, illustrates the type specimens, while another specimen has the median teeth closer together than those figured; 6–8 mm. ♀.

Chrysis nitidula Fabr., Ent. Syst. ii, 243, 21, 1793; Dahlbom, Hym. Eur. ii, 214.

Twenty specimens in the collection from the following localities: Massachusetts, Pennsylvania, Delaware, Lake Superior region, Canada, in the collection of M. Provancher. The general color is blue with green reflections and some purple. Two specimens have the head and thorax emerald-green with very little blue and the abdomen blue only on the first and second segments. All the specimens but those from Oregon (Mt. Hood) have cupreous, scarlet, golden and green reflections (in appearance like the colors of the spectrum) in a line, bordering the posterior margin of the anterior area of the third segment, just above the pits. A variety, represented by two specimens have Colorado, has the entire third segment uniformly cupreous with a dull, even purple tint. A specimen from Massachusetts has this color distinct only in certain lights; in other lights the segment is green or blue. The specimens from Mt. Hood, Oregon, have also the margin directly above the pits a little swollen or lobed in the extreme middle, and though the form of the apical teeth are the same it may be a distinct species. Head, thorax and abdomen for the most part densely punctured, the punctures finest on the third segment, largest on the metathorax and the first abdominal segment, separated on the sides of the first segment and the apical portion of the second. Pits medium, distinct, contained in a moderately strong groove, ending nearer the base of segment. Apical teeth seem to be quite constant in form and relative distance. The central emargination, as shown in the figure, is broader and less profound than the lateral ones. ♂ ♀.

Chrysis cœrulans Fabr., Piez. 173, 1804; Dahlbom. Hym. Eur. ii, 212, pl. xi, 110; Radoskovsky, Horæ Soc. Ent. Ross. iii, 305, pl. iv, fig. 19.

Chrysis nitidula Brullé, Nat. Hist. Ins. Hym. iv, 38.

Chrysis cœrulans (Lep.) Brullé, loc. cit. 37.

Chrysis bella Cresson, Proc. Ent. Soc. Phila. iv, 312, 1865.

The collection contains forty specimens, all of which, after careful examination, I have decided to place with this species. The localities are Canada, Maine, Massachusetts, New Jersey, Delaware, Virginia, North

Digitized by Google

Carolina, Georgia, Kentucky, Illinois, Wisconsin, Colorado, California, Oregon, Washington Territory and Vancouver's Island. The variations in the apical teeth are best shown by the figures; other specimens, including *bella* of Cresson, resemble *Nortoni*, while several agree with Dahlbom's figure and description. The color is blue, with more or less green and some purple reflections; some specimens are deep blue with much purple, others entirely emerald-green with no blue; basin of face punctured; head and thorax densely punctured; abdomen with the punctures more or less separated, close on the dorsum of the second segment in some specimens, in others separated. One or two specimens have a few scattered finer punctures between the larger ones on first segment. The lateral view of the third segment, the pits and the groove, as in *nitidula*. Radoskovsky's figure gives an excellent idea of the species.

Chrysis inflata n. sp.—Head and thorax emerald-green with more or less deep blue reflections, closely and equally punctured; basin of face punctured; abdomen emerald-green with deep blue and some dull purple on the dorsum, the blue more or less broadly diffused, sometimes covering a larger part of the second and third segments; abdominal punctures close and about equal; pits medium, rounded, distinct, contained at the bottom of a deep declivity which forms the anterior margin of the groove, and which is somewhat swelled, reaching a little towards the apex and overhanging the lateral margin nearly or quite to the base of the segment; teeth strong; wings hyaline, slightly infumated; 6–9 mm. ♂ ♀.

Southern California, Colorado and Utah; eight specimens. In one specimen the swelling above the groove is much exaggerated.

Chrysis Nortoni n. sp.—From deep blue with green and slight purple reflections to emerald-green with very little blue; head and thorax densely and equally punctured; abdomen with the base of the second segment and sometimes the third blue, or darker green; punctures a little separated, about equally distributed, in some specimens close on the dorsum and others with finer punctures scattered among the larger, on portions of the first segment; pits small, subdistinct and rounded, or sometimes somewhat confluent, contained in a medium groove, which ends near the base of the segment; teeth greatly turned down; wings hyaline, slightly infuscated; 6–9 mm. ♂ ♀.

Canada, Maine, Pennsylvania, Illinois, Colorado, Montana, Washington Territory, Oregon; seventeen specimens. The apical teeth vary, some specimens have the outer and median teeth much farther apart than the median, and *vice versa*.

Chrysis peracuta n. sp.—Blue and green with dull purple reflections; basin of face striated; head and thorax densely and equally punctured; abdominal punctures somewhat separated, largest on the first segment, close on the third; pits medium, or a little large, distinct and close, in a shallow but distinct groove, ending on each side near the base of segment; wings hyaline on the extreme margin, broadly infuscated on the middle and somewhat towards the base; apical margins are thin, sharp, the teeth pointed; 8–10 mm.

Digitized by Google

Kentucky, Georgia, Florida; four specimens. In the form of the margins and in the general shape of the third segment the species is allied to *C. fasciata* Fabr., from Mexico, but differs by having distinct pits contained in a deep groove. The abdomen of this species is considerably longer than the head and thorax combined.

Chrysis tripartita n. sp.—Head and thorax, with the metathorax and abdomen, emerald-green with very slight dull blue and darker green reflections; mesothorax deep blue with slight dull purple reflections; basin of face very narrowly striated; closely and about equally punctured all over, on the abdomen the punctures a little more separated; posterior surface of the postscutellum as viewed laterally not evenly rounded, but angled and almost projecting; pits medium, rounded, distinct, in a shallow groove that ends about midway on the lateral margin, or a little nearer the base of segment; apical teeth short, broad, round at the apices, the median teeth somewhat longer than the outer, much closer together and separated by a deeper emargination than the median and outer teeth; lateral margins about straight; wings infuscated, paler on the outer margin; 10.5 mm. long. ♀.

Arizona; one specimen. The position of the apical teeth resembles that of *C. pelucidula*, plate ix, fig. 58. The deep blue mesothorax divides the anterior and posterior portions of the insect, which are bright green, into three parts of color; a very odd character.

Chrysis propria n. sp.—Green with slight blue reflections, some specimens with distinct brassy reflections; basin of face striated; head and thorax closely and evenly punctured; abdomen with the punctures varying in different specimens, in some close and equally distributed, in others separated and with finer punctures scattered between; punctures close on the third segment in all the specimens, in some subconfluent; pits medium, in one specimen a little large, distinct, rounded, within luteous, semi-transparent when held against the light; groove shallow and with the pits ending on the lateral margin near the base of the segment; wings almost clear hyaline, a little infumated, in some specimens the radial cell is infuscated; 6–7.5 mm. ♂ ♀.

Montana, California, Colorado and Arizona; eight specimens.

Chrysis lauta Cresson, Proc. Ent. Soc. Phila. iv, 310, 1865.
Chrysis prasinus Cresson, loc. cit.
Chrysis pulcherrima Cresson, loc. cit. 311.

Eleven specimens; the localities are Washington Territory, California, Colorado, Arizona and Texas. The varieties (all of which we have in the collection together with the gradational forms) are shown in Mr. Cresson's excellent descriptions. We have not one of the three types in the collection; however, the descriptions agree perfectly. The median space of the mesothorax in *prasinus* being deep blue and black is very odd, but it cannot be considered a constant or important character. Our specimen of *prasinus* proper is from Arizona, not from Colorado. One specimen of *lauta*, from Colorado, is emerald-green with very bright

Digitized by Google

golden and brassy reflections with the median space on mesothorax anteriorly black in the middle. An extreme variety from Texas is deep blue with very little green. Basin of face in some specimens narrowly striated or smooth, in others broadly striated. In *pulcherina* the appressed white pubescence on each side of the face is not a constant character, as specimens have to a less degree, and in some it is wanting altogether. Pits small or moderate, distinct or confluent, rounded or oblong, contained in a distinct, sometimes shallow groove, ending midway on the lateral margin. In one specimen the pits are entirely confluent, forming a broad, deep sulcus upon the surface; 7–10 mm.

This is the most variable species belonging to the genus *Chrysis* with which I am acquainted, but the variations are not fairly correlated and are gradational, and therefore cannot properly separate the forms.

G.—Apical margin of the abdomen *sexdentate*.

Abdomen closely (often densely) punctured on the dorsum, the punctures sometimes a little more separated on the sides.

Lateral margins of third segment strongly arched outwardly towards the base and sinuate just before the outer teeth..... **texana.**

Lateral margins of third segment broadly sinuate or arched inwardly; pits contained in a deep groove, caused by the swelling of the posterior margin of the anterior area..... **clara.**

Lateral margins slightly bisinuate, straight or bowed outwardly, the pits contained in a moderately shallow groove, the margin of area not swelled.

The larger separated punctures on the sides of the first and second abdominal segments with the intermediate spaces mostly smooth, perhaps a very few smaller punctures here and there..... **intricata.**

The larger separated punctures on the sides of the first and second segments with the intermediate spaces rather closely beset with finer punctures. **sexdentata.**

Abdomen with the dorsal punctures sparse, well separated.

Punctures on the third abdominal segment nearly equal over the entire surface. **pennsylvanica.**

Punctures on the middle of the posterior portion of the anterior area of third segment, just above the pits, very small and dense as compared with the rest..... **smaragdula.**

Chrysis texana Gribodo, Ann. Mus. Genov. xiv, 329, 1879.

Four examples from Texas. Following are most of the essential points from Gribodo's description, it being too long to give verbatim:

Green, not very bright; head and thorax very closely, abdomen more sparsely punctured, all the punctures of moderate size, but the first segment of abdomen more heavily punctured; abdomen scarcely longer than the head and thorax taken together, perfectly cylindrical, apex as broad as base; anal margin sexdentate, teeth robust, triangular, somewhat equal; emarginations quite variable in form in different specimens, but always nearly equal in size; wings subhyaline, infumated.

Digitized by Google

♀.—Anterior area of the third dorsal segment of the abdomen sometimes slightly depressed, a little thickened and swelling above the anteapical series; anal margin low.

♂.—Larger, less punctured and the third dorsal segment of abdomen, both on the anterior area and the anal margin showing on both sides the same moderately convex surface (that is to say the anterior area before or above the anteapical row not elevated, nor thickened, nor swelling, and the anal margin not depressed nor low, the foveolæ of the series large, irregular and confluent, forming a broad and deep, transversely curved fovea. Texas. Length 8–11 mm.

The color is green, with more or less blue reflections, deepest on the dorsum of abdomen; a few scattered fine punctures between the larger separated punctures on the base of the first abdominal segment. The median teeth are twice as long as the outer teeth and longer than the second pair, but they are all equal in position, and I think that is the meaning that the above description intends to convey. Basin of face narrowly smooth, or with very fine striations in the middle. The pits in two specimens are distinct, moderate and with the shallow groove ending the base of segment. In another specimen the pits are subconfluent, and in the remaining specimen are entirely confluent on each side of the dorsum, divided in the middle and distinct and separated above the lateral margin. All of my specimens are males and agree with the description of Gribodo, but has he not taken the following species, *clara*, which is found in Texas, for the ♀ of his *texana?* The teeth and general appearance are much alike, but male specimens of *clara* have been found to agree with the females, and are almost certainly distinct from *texana;* and, furthermore, I am inclined to believe that the true female of *texana* will resemble the male in the structure of the third segment.

Chrysis clara Cresson, Proc. Ent. Soc. Phila. iv, 313, 1865.

Nine specimens from Washington Territory, Colorado, Arizona and Texas (the specimen from Colorado is the type). The color varies from emerald-green with bright brassy reflections to darker green with blue reflections. Basin of face punctured, a smooth space in the extreme middle. The larger punctures on the basal portion of the first segment with the space between them having scattered, finer punctures, also a patch of finer punctures on each side of the dorsum of the first segment. The swelling of the posterior margin of the anterior area is more exaggerated in some specimens than in others, and somewhat overhangs the pits. Pits rather large, distinct, rounded, in some specimens subconfluent; the groove ends on the lateral margin near the base of segment. The apical teeth vary slightly in position, the general form as seen from above resembles the figure of *smaragdula*. The figure representing this species is drawn from the type specimen; 10 mm. ♂ ♀.

Digitized by Google

Chrysis intricata Brullé, Nat. Hist. des Ins. Hym. iv, 25, 1846.

Seven specimens in the collection; from the localities Iowa, Georgia, Texas, Arizona, California and Dakota. From deep blue with very slight green reflections to dark green with blue and bright green reflections. Basin of face punctured, in some specimens with a narrow smooth space in the extreme centre. Head and thorax densely punctured, the punctures here and there confluent. Abdomen punctured rather closely, except on the first segment and the sides of the second, where the punctures are larger and separated. In one specimen the punctures are uniformly close and equal over the entire surface of the abdomen, in another they are larger on the extreme base of the first segment, but close. In a greater number of the specimens there is a patch of close, finer punctures on each side of the dorsum of the first segment. Pits medium, distinct, or subconfluent in certain specimens. Posterior margin of anterior area of third segment not swelled, but sometimes a little advanced, or sublobed in the middle. The groove not deep, but distinct, ending on the lateral margin quite near the base of segment, one specimen with the pits semi-transparent, luteous, the same color spreading upon the apical portion of the lateral margin and coloring slightly the apical margin. There is little variation in the position of the apical teeth; some specimens have the outer teeth blunt, less produced. Wings in one specimen clear hyaline, in the others infuscated or infumated; 8–9.5 mm. ♂ ♀.

Chrysis sexdentata Fabr., Ent. Syst. Suppl. 258, 20, 1798; Brullé, Nat. Hist. des Ins. Hym. iv, 25 (?); Dahlbom, Hym. Eur. ii, 324.

One specimen from Georgia. I am almost sure about the determination from Brullé. I have supposed it to be the Fabrician species. It is difficult to determine whether Dahlbom describes the same species or not. The punctures of the head and thorax are large, very dense, but only here and there confluent. Basin of face punctured. The abdominal punctures are largest and separated on the first segment, and together with the punctures on the sides of the second have finer punctures between them. A patch on each side of the dorsum of first segment closely and finely punctured; the entire dorsum of the second segment and all of the third with rather close, small, equal punctures. Pits numerous, small, round, distinct, seemingly deep, contained in an equal shallow groove, ending on each side near the base of segment. The apical teeth are about equal in position, the median ones largest, and the emarginations between them deepest; the second pair are more acutely pointed, the emarginations rounded; the outer teeth scarcely deserve the

Digitized by Google

name, being but very slightly produced angles. In this last character alone the species does not resemble *sexdentata* as described, but the form of the outer teeth in all the species varies considerably in form, and probably this is an extreme form. The lateral margin is straight. Wings hyaline, a little clouded; 10 mm. The specimen is rather long and slender, hardly tapering at the apex.

Chrysis pennsylvanica (Lep.) Brullé, Nat. Hist. des Ins. Hym. iv, 24, 1846.

One specimen from Florida (Philadelphia, Brullé). Deep blue with dull purple and bright green reflections, elegant reddish purple on the abdominal sutures. Basin of face punctured, a narrow, smoothed space in the centre. Head and thorax with the punctures somewhat separated, with some scattered finer punctures on the prothorax. Abdominal punctures well separated, equal. Pits rather large, deep, somewhat confluent on the dorsum, distinct and separated on the sides; pits forming the groove, which ends on each side near the base of segment. Wings subhyaline, a little clouded, the nerves somewhat rufescent; 10 mm. ♂. The mesothoracic interlobular lines are called crenulated, by Brullé, on account of being cut by the punctures.

Chrysis smaragdula Fabr., Ent. Syst. ii, 239, 1793; Dahlb., Hym. Eur. ii, 337.

Five specimens from the localities: Pennsylvania, Delaware, North Carolina, Florida and Kentucky. From emerald-green with blue reflections to deep blue and purple with green reflections; the abdominal sutures bright reddish purple. Basin of face punctured, a little smoothed in the centre. Head and thorax closely punctured, on some portions the punctures are very slightly separated. Abdomen with the punctures about equal and equally separated over the entire surface of the first and second segments; third segment with the punctures a little smaller and closer; a patch of fine, close punctures on the middle of the posterior margin of the anterior area just above the pits. Pits rather large, shallow, distinct, in some specimens; in others subconfluent on the sides forming the rather shallow groove which ends on the sides near the base of segment. The apical teeth vary somewhat in relative position in different specimens. Wings subhyaline; 13–15 mm. The largest North American species representing this genus.

Chrysis inaequidens Dahlb., Hym. Eur. ii, 334, 1854.

This species is not in the collection and is unknown to me. Dahlbom's description reads as follows:

Digitized by Google

"Of moderate size, two and two-thirds lines. Habitat—New York. A single specimen. Almost the size of *Chrysis nitidula* ♁, the body of moderate size as to thickness, above green-blue, the head in front, pectus, and feet green, the venter strongly vaulted, for the most part concolorous; tarsi fuscous; head and thorax closely but moderately punctured; facial cavity of the head rectangular, punctured, cariaceous, of moderate size, margined above, transverse margin unequal, subarcuate; antennæ of moderate size, fuscous, green at the base; clypeus short, transverse, punctured, convex on the disc, slightly arcuate; emarginate at the centre of the apical margin; mandibles piceous, greenish at the base; thorax thick, subquadrate-cylindrical, quite convex on the dorsum; posterior lateral angles of the metanotum robust, triangular; margins of the mesoplurse obsoletely crenulated; abdomen of moderate size, of the length of the head and thorax taken together, obtusely rectangular, quite convex on the dorsum and very densely punctured; each lateral intramarginal area of the first dorsal segment cuneiform, sprinkled with thick punctures, arranged almost alternately, margined, slightly concave; third dorsal segment short, entirely depressed, convex; anteapical series with numerous, rounded, unequal foveolæ, that is to say, larger, of moderate size and small; apical teeth acutely triangular, unequal in size, the two intermediate ones larger and more robust, the two secondary ones of moderate size, the two external ones shorter and a little broader; emarginations also unequal, the central one large, triangular, deep; the secondary ones of medium size, moderately and somewhat obliquely arcuate, the two external ones small, also obliquely arcuate."

Evidently very distinct. Is it not possible that the locality may be erroneous, and that this is not a North American species?

STILBUM Spinola.

Ins. Ligur. i, 9, 1806.

The genus is sufficiently characterized in the generic key. As far as our present knowledge of the North American species extends *Chrysis* and *Stilbum*, while having many characters in common or in close resemblance, have also a correlation of differences that show them to be quite distinct and very strongly marked genera. How they may approach each other by the modifications of *exotic* species, I have had no means of determining.

Stilbum amethystinum.

Chrysis amethystina Fabr., Syst. Entom. ii, 359, 1793.
Stilbum splendidum Brullé, Hist. Nat. des Ins. Hym. iv, 15; Dahlb., Hym. Eur. ii, 358, pl. xii, fig. 114 (not Fabricius).
Stilbum calens Spin., Ins. Ligur. i, 19, 1806; Brullé, loc. cit. 16; Dahlb., loc. cit. 360; Radoskovsky, Horæ Soc. Ent. Ross. iii, 308, pl. vi, fig. 35.
Stilbum Wesmaeli Dahlb., loc. cit. 359, plate xii, fig. 115, 1854.
Stilbum amethystinum Smith, Trans. Ent. Soc. Lond. 470, 1874.

A single specimen from Ontario in M. Provancher's collection. It agrees perfectly with Dahlbom's figures, etc., and with Brullé's descriptions. For its differing from the true *S. splendidum*, of Fabricius, I take Smith's determination. This specimen may be described as follows:

Digitized by Google

♀.—Deep chalybeous and purple, the third abdominal segment entirely metallic purple; basin of face cross striated, above a large foveolæ enclosing the anterior ocellus, and caused by the upward continuation of the carina across the front; prothorax with the surface uneven, much wider at the sides than in the middle, with large shallow punctures; mesothorax with the punctures moderately strong directly and on the posterior portion of the median division. but on the dorsum, becoming more shallow separated depressions; tegulæ small, oval, almost smooth; metathorax with larger and deeper punctures than the other portions of the insect; prolongation of the postscutellum deeply excavated above (the excavation deeper than in Dahlbom's figure); abdomen with the second segment three times as long on the dorsum as the first segment, the first sharply angulated at its anterior corners, flattened on the sides; second segment with the lateral margins extremely short as compared with the dorsum; third segment with the depression very deep and broad; the pits eighteen or twenty, distinct, rounded, seemingly deep, situated at the bottom of a perpendicular declivity; the apical teeth, four in number, large, pointed, the two median ones projecting beyond the others, but with the central emargination smaller and narrower than those between the median and outer teeth; lateral margins arched outwardly, a little sinuate just before the outer teeth; entire abdomen with small, round, very much separated punctures on a smooth surface; those on the last segment very much smaller except at the extreme base, where they are large and close; femora and tibiæ entirely blue, the tarsi tinged with green, the basal half of the brown antennal joints tinged with green; 15 mm. long.

Sub-family—PARNOPINÆ.

PARNOPES Fabr.

Syst. Piez. 177, 1804.

This genus stands by itself and is very widely separated. The characters are those of the sub-family. It may be at once distinguished by the lengthened bee-like proboscis. The male has four abdominal segments and the female three, the apical segment being longer in the female.

Postscutellum with its posterior margin entire.....**Edwardsii.**
Postscutellum with its posterior margin deeply notched in the middle (according to Smith's description.....**chrysoprasina.**

Parnopes Edwardsii.

Euchroeus Edwardsii Cresson, Trans. Am. Ent. Soc. vii, Proc. Ent. Section 1879, p. iv.
Parnopes Edwardsii Cresson, loc. cit. page x.

The color varies from emerald-green with golden or brassy reflections to deep blue and purple with some green reflections; two specimens from Vancouver are dull colored, partly fuscous on the thorax, the single male specimen is deep blue. One Californian specimen has strong cupreous

Digitized by Google

and golden reflections on the pro- and mesothorax. Projection of the postscutellum quadrate, straight and entire on its posterior margin. The many small apical teeth are fine and sharp.

California and Vancouver's Island; seven specimens including the types.

Parnopes chrysoprasina Smith, Trans. Ent. Soc. Lond. 454, 1874.

Not known to me. I give Smith's description in full. The species will probably be found in other localities besides that mentioned.

"Male.—Length four and a half lines. Green, with the basal margins of the second, third and fourth segments blue; head, thorax and abdomen closely and strongly punctured, the thorax rather more strongly so than the head or abdomen; antennæ rufo-testaceous, one or two of the basal joints tinged with green; the legs rufo-testaceous, the femora darkest, and, as well as the tibiæ, tinged with green; the tegulæ strongly punctured, tinged with green, and having their outer margin pale testaceous; wings pale fulvo-hyaline; the postscutellum nearly quadrate, a little longer than broad, deeply notched in the middle of the posterior margin; the apical segment with two large, deep foveæ near its apical margin, which is denticulated.

"Hab.—North Carolina."

A partial list of the more important writings on the CHRYSIDIDÆ.

Abeille de Perrin.—Syn. Critique et Synonymique des Chrysides de France. Ann. Soc. L. Lym. xxxvi, 1880, p. 1, pl. 1–2.

Brulle.—Hist. Nat. des Ins. Hyménoptères, vol. iv (Suites á Buffon), 1846.

Cresson.—Proc. Ent. Soc. Phila. iv, 1865, p. 103, p. 105, p. 303 (new species).

" Trans. Am. Ent. Soc. vii, 1879, pp. iv and x of the Monthly Proceedings (new species).

Dahlbom.—Hymenoptera Europæa, vol. ii, Chrysis, 1854 (many very fine plates with details).

Gribodo.—Ann. Mus. Genov. vi, 1875, p. 359 (new species).

" Ann. Mus. Genov. xiv, 1879, p. 329 (new species).

Norton.—On the Chrysides of North America, Trans. Am. Ent. Soc. vii, 1879, p. 233. Considers only the Genera Elampus (= Omalus Elampus and Notozus in one), Holopyga, Hedychrum and Chrysis (the 4 and 6 dentate species not studied).

Patton.—Canadian Entomologist, xi, 1879, p. 66 (four new species described).

Provancher.—Petite Faune Entomol. du Canada, Naturaliste Canadien, vol. xii, 1880–81, p. 300 (six new species).

Radoskovsky.—Catal. Chrys. Russia, with many fine plates. Horæ Ent. Soc. Rossicæ, iii, p. 225.

F. Smith.—Trans. Ent. Soc. London, 1874, p. 451 (revises certain genera and describes new species).

Tachenburg.—Hymenoptera Deutschlands, p. 148 (tabulates nine genera).

Digitized by Google

EXPLANATION OF PLATES.

PLATE VI.

Fig. 1. Cleptes insperatus.
" 2. " " lateral view of abdomen.
" 3. Omalus iridescens, third abdominal segment.
" 4. " diversus, " "
" 5. " læviventris.
" 6. " " third abdominal segment.
" 7. " " tarsal claw.
" 8. " sinuosum, third segment.
" 9. " coruscans, third segment.
" 10. " " pro- and mesothorax and scutellum.
" 11. " " tarsal claw.
" 12. " semi-circularis, third abdominal segment.
" 13. Elampus variatus, pro- and mesothorax and scutellum.
" 14. " " third abdominal segment, as viewed posteriorly, showing the notch of the apical projection.
" 15. Elampus variatus, third abdominal segment, viewed laterally.
" 16. " Cressoni.
" 17. " speculum.
" 18. Diplorrhos plicatus, third abdominal segment, lateral view, showing the two apices and the submarginal fold.
" 19. Notozus versicolor, third abdominal segment, viewed posteriorly, showing the apical notch and its closing membrane.
" 20. Notozus versicolor, third abdominal segment, viewed laterally.
" 21. " viridicyaneus, third abdominal segment.

PLATE VII.

Fig. 22. Notozus marginatus, third abdominal segment.
" 23. " productus.
" 24. " " third abdominal segment.
" 25. " seminudus.
" 26. Hedychrum obsoletum.
" 27. " violaceum, posterior view of the postscutellum, showing the median ridge and the foveolæ.

Digitized by Google

Fig. 28. Hedychrum violaceum, tarsal claw.
" 29. " continuum, posterior view of the postscutellum, showing the following punctured area.
" 30. Hedychridium dimidiatum, posterior view of the postscutellum.
" 31. " " second and third abdominal segments.
" 32. " " tarsal claw.
" 33. " cæruleum, posterior view of the postscutellum.
" 34. Holopyga ventralis, tarsal claw.
" 35. " horus.

PLATE VIII.

Fig. 36. Chrysis verticalis, anterior view of head.
" 37. " " third abdominal segment.
" 38. " inusitata, anterior view of head.
" 39. " optima, third abdominal segment, showing the prolongation of the fourth segment and the apex of the ovipositor.
" 40. Chrysis inusitata.
" 41. " hilaris, metathorax.
" 42. " tota, third abdominal segment.
" 43. " perpulchra, third abdominal segment.
" 44. " densa, " "
" 45. " discreta, " "
" 46. " parvula, lateral view of mesothorax, showing prolongation of postscutellum.
" 47. Chrysis parvula, third abdominal segment.
" 48. " scitula, " "
" 49. Parnopes Edwardsii.

PLATE IX.

Fig. 50. Chrysis Meta.
" 51. " dorsalis.
" 52. " montana.
" 53. " "
" 54. " Frey-Gessneri.
" 55. " "
" 56. " hirsuta.
" 57. " "
" 58. " pelucidula.
" 59. " "
" 60. " Pattoni.
" 61. " venusta.

Digitized by Google

Fig. 62. " nitidula.
" 63. " "
" 64. " cœrulans.
" 65. " "
" 66. " "
" 67. " "
" 68. " inflata.
" 69. " "

PLATE X.

Fig. 70. Chrysis Nortoni.
" 71. " "
" 72. " "
" 73. " "
" 74. " peracuta.
" 75. " "
" 76. " propria.
" 77. " "
" 78. " lauta.
" 79. " "
" 80. " " var. pulcherima.
" 81. " " " "
" 82. " smaragdula.
" 83. " Clara.
" 84. " intricata.
" 85. " "
" 86. " pennsylvanica.
" 87. " texana.
" 88. Prothorax of *Chrysis* quadridentate, subgenus first division.
" 89. " " " " second division.

Digitized by Google

Monograph of the earlier stages of the ODONATA.

Sub-families GOMPHINA and CORDULEGASTRINA.

BY DR. H. A. HAGEN.

Mr. Louis Cabot has published in the "Memoirs of the Museum of Comparative Zoölogy" the immature state of the Gomphina 1872 (ready for publication 1871) and of the Aeschnina 1881 (ready for publication 1873). As there is no hope of seeing the four other parts published by him, and as the collection has received additions so numerous as to justify a new publication, the first part containing the two sub-families Gomphina and Cordulegastrina (the latter was considered formerly as belonging to the Gomphina) will commence the series. Of the seventeen species described by Mr. Louis Cabot, only four were raised. The material is now three times as large; of the forty-eight described species sixteen are raised. The determination of the species is made according to the "Monographie des Gomphines par Edm. De Selys Longchamps," and the four additions to the Synopsis des Gomphines by the same author. These works contain the descriptions of 240 species. This paper was ready for publication April, 1884. The help given to my work by other entomologists is thankfully acknowledged with each species.

SYNOPSIS.

Tarsi with 2-2-3 joints.....Legio GOMPHUS and GOMPHOIDES.
Tarsi with 2-2-2 joints.....Legio LINDENIA.
Tarsi with 3-3-3 joints.....Sub-family **CORDULEGASTRINA.**

Hind legs more distant at base than the others.....Legio GOMPHUS and GOMPHOIDES.
Palpus not dentated, without terminal hook..HERPETO- and OPHIOGOMPHUS.
Palpus dentated, with terminal hook.....**GOMPHUS.**

(The first two genera have the middle third of the front margin of the mask produced in a rounded lobe; the others not; for some exceptions the text is to be compared.)

Middle legs less distant than forelegs; abdomen prismatic.....**Progomphus.**
Middle legs and forelegs equally distant; apical third or more of the abdomen formed by the thin cylindrical tenth segment.....**Gomphoides.**
Middle legs more distant than forelegs; abdomen flat, circular.....**Hagenius.**

Digitized by Google

Sub-family—GOMPHINA.

I Legio GOMPHUS.

Genus **GOMPHUS.**

Selys Monogr. Gomphin. p. 12.

This genus represents alone the Legio Gomphus, Selys.

The known nymphæ of the great genus Gomphus are homogeneous in the following characters:

1. The hind legs are more distant at the base than the fore- and middle legs, which are equally distant, and fitted for burrowing by a strong external hook (rarely less developed or wanting) on tip of tibia, and often also an internal hook on tip of femur; the four anterior tarsi are 2-jointed, the posterior ones 3-jointed.

2. The head is depressed, more or less flattened; the antennæ are short, 4-jointed; the two basal joints short, annular, the third longer than both together, stout, the fourth rudimentary and very small; the eyes large, globular; in transformation the skin splits through the middle of the eyes; the large labrum forms a kind of cap; its front margin is sharply edged by a flat plate forming inside an angle with the upper part of the labrum; in fact this plate is the front margin of the labrum bent down very suddenly; the mask reaches this flat plate and never exceeds it.

3. The mask is flat, reaching to the forelegs, quadrangular or oblong; the middle third of its front margin is straight, or advanced in a more or less produced rounded lobe, with short pavement teeth and a comb of flat scales; this lobe has sometimes one cylindrical tooth in middle, or even two separated teeth; in one instance the lobe is cleft; the palpus is small, just reaching the opposite one, rounded on tip or strongly hooked, serrated or dentated on its inner margin, or plain.

4. The prothoracic stigma is free, uncovered; the abdomen, twice as long as broad, lancet shaped, or narrower and more elongate, spindle shaped; two longitudinal ventral sutures ending in apical angles of 9th segment divide the venter in three equally broad spaces; ventral bags on the base of segments 4 to 6; segments of about equal length, but the 9th mostly longer than 8th, and the 10th short, even very short; in one instance longer than 9th; appendages short, pyramidal, pointed, the inferiors a little longer than the superior, which is again longer than the laterals; lateral spines present on segments 7 to 9, or 6 to 9; rarely on 5 to 9, or even on 2 to 9; exceptionally only on 6 to 7, and once rudimentary only on 9; dorsal hooks more or less developed on segments 2

Digitized by Google

to 9, or on some of them, or entirely wanting, and then some of the segments 5 to 8, or less divided in two halves by an impressed longitudinal middle line.

Of the 21 subgenera accepted by De Selys, only 4 are known by raised nymphæ, and 3 more by supposition; of the 113 species in De Selys last list, to which now are to be added about 40 more, only 12 are known by raised nymphæ, and 17 only by non-raised nymphæ, for which, in a few cases, supposition is tried. It is to be presumed, of course, that the four-fifths of the species not yet known may modify the given characters and necessitate, perhaps, for some of the subgenera a higher standing.

In 1872 Mr. L. Cabot described 8 species, of which only 2 were raised, all of which were contained in the collection of the Museum.

Of the now described 29 species 21 are from the West Indies and Mexico, 4 from Brazil, 4 from East India and 1 from Europe, of which 12 were raised. There are known now 61 species from the United States and Mexico, so that the known nymphæ represent one-third of the known imagos.

The very important question whether the nymphæ corroborate the adopted subgenera or groups cannot yet be considered seriously, because only 4 of the 21 subgenera are represented by raised nymphæ. After all some remarks seem not to be out of place.

Two species may be excluded directly from the others by some very heterogeneous characters.

1. The species referred to as possibly belonging to Cyclogomphus has the lobe on the middle third of the front margin of the mask deeply cleft. This character is quite unique for Gomphus and combined with the lack of the apical hooks of the anterior tibiæ seems to indicate a higher position than a subgenus. It is the most aberrant nympha among those known of the genus Gomphus.

2. The species from Brazil supposed to belong to Epigomphus. The unusual length of the 10th segment of the abdomen and the also unusual occurrence of two teeth on the lobe of the front border of the mask seem to indicate a higher position than a subgenus. The length of the 10th segment corresponds well with Epigomphus, and was indeed the reason for my supposition.

The known nymphæ, the two just spoken of excepted, are divided in two large groups:

1. The palpus is without terminal hook, not dentated; the middle third of the front margin of the mask produced in a rounded lobe; ten specimens.

Digitized by Google

2. The palpus has a sharp terminal hook and is dentated; the middle third of the front margin of the mask is cut straight (some exceptions to be mentioned); eighteen specimens.

The first group belongs to Onychogomphus, Herpetogomphus and Ophiogomphus.

Onychogomphus known by but one Asiatic species differs from the others by the prismatic shape of its body, rather similar to Progomphus and by the exceptionally large number of lateral spines on segments 2 to 9, characters perhaps to be modified by other species. In this neighborhood is to be placed the nympha from the Himalaya with a long triangular lobe of the mask; perhaps it belongs to Heterogomphus.

The nympha of Herpetogomphus (three specimens) and Ophiogomphus (five specimens) so similar one to the other that I could not find any differences, are directly separated from Onychogomphus by the flat lancet-shaped abdomen.

The nymphæ of the second group (eighteen specimens) are somewhat polymorphic. The species belonging to the group of *G. plagiatus* represent a type different from the others by the very long spindle-shaped abdomen, which is not broader than the head, by the length of 9th segment, by the small hook on the anterior tibia and by only two or three teeth near the terminal hook of palpus. The burrowing for a narrower spindle-shaped abdomen is obviously easier, and explains the smallness of the hook of the tibia. To this group belongs *G. plagiatus*, *G. notatus*, *G. spiniceps* and perhaps *G. olivaceus*. Of the latter species the male is not yet known, and the rounded lobe of the mask, which is wanting in the other species, makes its place in this group doubtful.

The nympha of *G. pallidus* and of the species supposed to belong to *G. pilipes* by Mr. L. Cabot are exceptional by the shape of the abdomen, which is broad, flat and slopes strongly at tip, the 9th segment long; the mask has a rounded lobe with a cylindrical tooth in the middle. The length of the 9th segment corresponds with the length of this segment in the imago as well as for the group of *G. plagiatus*.

Another group is represented by *G. vulgatissimus* and three not raised species. The flat lancet-shaped abdomen has the dorsal segments 3d to 8th or less, divided by a sharply impressed middle line in two halves; the mask straight, the palpus strongly dentated.

The last group, all North American species, only two of them raised, have the dorsal segments not divided, but with strong dorsal hooks, the abdomen is less flat and mostly narrower, the mask straight, the palpus dentated, mostly from base to tip. To this group belongs *G. vastus*, *G. exilis*, and related species.

Digitized by Google

The nymphæ actually known are certainly not sufficient for more stringent conclusions. The existence of at least two large groups (palpus with terminal hook or without it, corresponding with the difference in the front margin of mask) is proved; if there exist more, as it is possible, and indicated by the nymphæ supposed to belong to Cyclogomphus and Epigomphus, farther experience has to decide.

The question of accepting a higher rank than that of subgenus for some of the groups now proposed, can only be decided after a sufficient knowledge of the nymphæ of the other subgenera accepted for known imagos.

Sub-genus ONYCHOGOMPHUS (raised).

Head cordate; antennæ rather slender, 3d joint long, cylindrical, 4th short, one-third as long as 3d, conical; mask one-fourth longer than broad, middle third of front margin produced in a rounded lobe with pavement teeth and a comb of flat scales; palpus triangular, tip rounded and a little bent; movable hook long, sharp; abdomen three times as long as broad, scarcely broader than the head, all segments of equal length, the four apicals tapering; dorsum slightly rounded; lateral spines on segments 2 to 9; only indications of dorsal hooks; genital parts not marked; appendages a little longer than last segment, triangular, sharp, the inferiors a little longer; legs short, strong, 3d joint of posterior tarsi visibly longer than the two basal ones.

The nympha resembles those of *Progomphus obscurus* in shape, but is easily separated by the equally distant four anterior legs. The nympha is known of but one of the twenty-two described species, therefore the genus character may have to be modified, when more species are known.

1. **Onychogomphus lineatus** (raised).
Selys. Monogr. Gomph. p. 48.

In alcohol fifteen nympha skins and nymphæ full grown or less, one very young. With the nympha skins a teneral male imago.

From swamps of East Jumna, a holy tank near Delhi, East India; Rev. M. M. Carleton, 1875. Length 21–27 mm.; young, 11 mm.

Body rather prismatic; abdomen as broad as head, three times longer than broad; head and antennæ very hairy; joints 1 and 2 short, 3d long, cylindrical, rather stouter at tip, which is truncate; 4th small, conical, one-third of 3d; mask reaching first legs, one-fourth longer than broad, middle third of front margin produced in a rounded lobe about four times broader than long, with square pavement teeth; above and before the teeth are inserted in a short, rounded base flat scales, forming a comb, four times longer than the teeth; the scales are divided by longitudinal folds more strongly marked at tip, which is not split, though it looks so, being folded up; palpus triangular, tip rounded, a little curvated; movable hook much longer, sharp; the inner margin of both with faint linear impressions; mandibles with four lancet-shaped teeth at tip, the inner ones shorter; second row very small; between two sharper teeth are five very small

Digitized by Google

ones; maxillæ above with four strong spines, below with three shorter ones; palpus as long as the superior spines, but stouter; wing cases covering partly 4th segment; abdomen not very broad, all segments of nearly equal length; the last four tapering; lateral spines on segments 2 to 9; dorsal hooks only indicated on segments 2 to 9 by somewhat thickened round lobes, a little larger on segments 2 and 3; appendages a little longer than the last segment, sharp, the inferior ones a little longer; abdomen above on segments 2 to 9 with four rows of blackish spots, one on each side nearer to the margin, the others near the middle forming with the dorsal hooks a kind of "fleur de lis;" legs short, strong, adapted for burrowing; hind legs a little longer, reaching segment 5.

The wing cases of the smallest nympha covering only half of segment 1; lateral spines only on segments 5 to 9; no dorsal hooks; last joint of antennæ longer and stouter; the vertum with the gills is left in the nympha skin. Indications of the genital parts are not visible; middle field between the two ventral sutures as broad as the lateral ones.

The nympha of *C. lineatus* is similar to those of *Prog. obscurus*, but directly to be recognized by the equally distant fore- and middle legs; in *Prog. obscurus* the middle legs are less distant from each other, than the fore legs.

2. **Gomphus** spec.

Two nymphæ in alcohol, one young, the other not full grown; from the Sutledge River above Billespur, Himalaya, by Rev. M. M. Carleton, 1872. Length 29–21 mm.

Body stout, very hairy; head cordate, short, nearly straight behind, somewhat less in the younger one; hind angles oblique, rather sharp; antennæ short, third joint very little longer than twice the length of the two basal ones and scarcely broader, cylindrical, bent a little, truncate; fourth joint as long as the tip of third, broad, short, ovoid; mask as long as broad, concave in middle, sides oblique, base one-third shorter than front margin; middle third produced in a triangular lobe, three times broader than long, tip strongly rounded, with a comb of flat scales; palpus short, triangular, rounded above, tip nearly sharp, a little bent, very little serrate; movable hook long, bent, sharp; wing cases covering half of third segment; abdomen three times longer than broad, segments of equal length, 10th one-third of the foregoing; dorsum flatly rounded, no dorsal hooks, apical margin of 9th with a small triangular hook in middle; lateral spines on segment 7th to 9th strong, sharp, the last nearly as long as segment 10th, lateral margin of those segments with a series of small teeth; scars as usual; genitals not marked; appendages twice as long as 10th segment, triangular, sharp, the laterals a little shorter; legs long, anterior not much thicker than posterior, which reach half of 7th segment; third joint of posterior tarsi scarcely longer than second.

The species and group of these nymphæ are unknown; the principal characters are:—the shorter head, straight behind, with marked angles; the shorter mask with triangular lobe, without visible pavement teeth; the short palpus, triangular, the tip sharp, a little bent; the flat, long abdomen with strong lateral spines on 7 to 9, and no dorsal hooks; the long legs. The larger nympha shows that it has still to undergo a change

Digitized by Google

of the skin. Perhaps they belong to some of the large Indian species, Macrogomphus or Heterogomphus; the place after or near Onychogomphus seems to be indicated by the palpus and the front border of the mask.

Sub-genus HERPETOGOMPHUS (raised).

The species belonging now to Herpetogomphus were at first described in De Selys Synops. Gomphin. p. 20, as a separate group of Ophiogomphus. Later (Monogr. Gomphin p. 70) a new sub-genus Herpetogomphus was proposed because the male organs proved to be remarkably different. Ophiogomphus and the larger part of all sub-genera of Gomphus have the second joint of the penis longer than the third and below with a long basal tooth directed to the tip of the joint. Herpetogomphus, Ceratogomphus, Onychogomphus and Anormogomphus have the second joint of the penis shorter than the third and without tooth, but the third joint has two small spines directed to the base of the joint. The consequence of such differences in the male organs lead us to suppose analogous differences in the female organs and are, as far as I know, generic differences. Later De Selys, in four additions Synops. Gomph. and in Compt.-Rend. Soc. Ent. Belg. May 3, 1879, has denied the generic importance of this character and has given other characters to separate the sub-genera Herpetogomphus and Ophiogomphus. There are known now ten species belonging to each of those sub-genera. All Herpetogomphus are North American species, and as I believe representing in America the sub-genus Onychogomphus, which belongs to the old world. I have to confess that the previous stages seem not to confirm my views. The nymphæ differ essentially from those of Onychogomphus, and are so entirely alike to those of Ophiogomphus, that I am not able to find any difference between them.

3. **Herpetogomphus designatus** (raised).
Hagen Monogr. Gomphin. p. 401.

Two nympha skins, one with the teneral female on the same pin. San Antonio, Texas, by Mr. A. Agassiz; a male nympha skin from Dallas, Texas, in McLachlan's collection. Length 25 mm.

Head strongly cordate, deeply notched behind; eyes very prominent; antennæ stout, little longer than labrum, third joint less than twice as long as the two globular basal ones, somewhat larger on tip, flattened above; fourth very short, pyramidal; mandibles with four teeth at tip, the interior longest, the others successively shorter; second row narrower, curvate; mask quadrangular, little narrower at base, middle third produced in a short rounded lobe, with fine pavement teeth and a comb of scales; palpus short, straight, rounded on tip, very finely

Digitized by Google

serrate; movable hook short, sharp; prothorax short, lateral angles rounded; wing cases covering segment 4; abdomen half as broad as long, tapering to base and to tip; convex above; segments of equal length, only tenth less than half as long; lateral spines on segments 6 to 9, the last one half as long as segment 10; dorsal hooks strong on segments 2 to 4, only indicated on the following ones, represented on 8 and 9 by the middle of the apical border produced; segments 2 to 9 on each side with a scar and a small linear brown spot; part between the ventral sutures as broad as the lateral ones; appendages twice as long as segment 10, very sharp, the lateral ones very little shorter than the others, female genitals represented by two cylindrical knobs at the end of 8th segment; legs rather slender, the four anterior fitted for burrowing; hind ones reaching segment 7; the whole body very little hairy on the legs and abdominal margin.

A very small nympha, length 15 mm., from Arizona, belongs to the same species by the number of lateral spines and the dorsal hooks; the hind femurs are blackish at base and before tip; the segments have besides the linear spots one spot on each side near the middle line; the dorsal hooks are dark, a brown spot near the lateral margin of the segments.

4. **Herpetogomphus Menetriesii** (supposition).
Selys Synops. Gomphin. quatr. addit. p. 24.

A nympha from Guatemala. Length 18 mm.

The probably young nympha has lateral spines on 6th to 7th segment and very strong developed dorsal hooks, all erected on segments 2 to 9; the last segment a little longer than in *H. designatus;* appendages all of nearly equal length; wing cases covering half of segment 4.

The spines and horns of the abdomen seem to exclude the possibility of bringing the nympha to the other described species, though all other characters agree with the genus.

The only species known from Guatemala is *H. Menetriesii.*

5. **Herpetogomphus compositus** (supposition).
Hagen Monogr. Gomph. p. 400; Cabot p. 4, No. 6, pl. 2, fig. 6.

Five nymphæ in alcohol, the largest one probably full grown, from Poole's Creek, N. Mexico (formerly W. Texas) by Capt. Pope's expedition. Length 24–14 mm.; breadth 7–5 mm.

The largest nympha is described by Mr. Cabot and agrees so well with those of *H. designatus* that there cannot be any doubt about its generic position. *H. compositus* (imago) was collected also by Capt. Pope; the size and similarity of *H. designatus* and *H. compositus* make the determination very probable.

The nympha differs from *H. designatus* by joint three of antennæ shorter, more dilated, fourth a little longer, conical; dorsal hooks on segments 2 to 9 well developed, on the last segments represented by tri-

Digitized by Google

angular, sharp prolongations; lateral spines only on segments 7 to 9; lateral appendages shorter than in the other species; legs and abdomen rather more hairy; no linear blackish spots on the segments; the smaller nymphæ with less marked dorsal hooks.

The large nympha Cabot p. 1, pl. 1, fig. 2, formerly supposed to belong to Herpetogomphus is now described as Epigomphus.

Sub-genus OPHIOGOMPHUS (raised).

Head cordate; antennæ stout, joint three enlarged, fourth very small, conical or rudimentary; mask quadrangular, scarcely longer than broad, a little narrowed at base; middle third produced in a very short rounded lobe with pavement teeth and a comb of flat scales; palpus short, straight, rounded at tip, very finely serrate; movable hook short, sharp; abdomen lancet shaped, about half as broad as long, dorsum roof shaped; lateral spines short on segments 6 to 9 or only on 7 to 9; dorsal hooks on segments 2 to 9 sometimes merely indicated on the middle segments; segments of nearly equal length, 10th only half as long; the four apical segments tapering; genitals of both sexes visibly marked; appendages longer than last segment, triangular sharp. the lateral ones a little shorter; legs short, the four anterior equally distant at base, the posteriors more separated; joint three of posterior tarsi as long or longer than the two basal ones.

The nymphæ of Ophiogomphus are very much alike to those of subgenus Gomphus, but visibly stouter. There is no difference among the nymphæ of Ophiogomphus and Herpetogomphus.

The nympha is described for six of the ten known species.

6. **Ophiogomphus colubrinus** (raised).

Selys Monogr. Gomphin. p. 76.

A dry female nympha with the imago half transformed.

Orono, Maine, by Prof. Fernald. Length .23 mm.

Head strongly cordate, eyes prominent; antennæ short, third joint less than thrice the length of the two basal ones, flat, very much enlarged to tip; fourth joint rudimentary, represented by a larger rounded knob, a little pointed internally, forming the tip of joint three; mask quadrangular, narrowed at base, middle third produced in a short rounded lobe with pavement teeth and a comb of scales: palpus short, straight, somewhat narrowed to the rounded tip, very finely serrate; movable hook sharp, not reaching the base of the opposite one; wing cases covering segment 4; abdomen half as broad as long, tapering on tip, convex above; segments of equal length, only 10th half as long; lateral spines short, on segments 7 to 9; dorsal hooks forming rounded lobes on segments 2, and 7 to 9, very little indicated on the others; a scar on each side of the segments and some ill defined darker spots; part between the ventral sutures as broad as the lateral ones; female genitals represented by two small brown knobs; appendages about twice as long as segment 10; triangular, sharp, laterals one-third shorter; legs short, slender; joint three of posterior tarsus longer than the two basals together.

In the collection of Mr. McLachlan, England, is a nympha skin with the just emerged imago from Newfoundland, labeled: Terra Nova River,

Digitized by Google

emerging from case while on a stone July 22, 1874. The pinned imago is a male not yet stretched out. After a careful comparison with the only male in the collection of *C. colubrinus* it belongs very probably to this species. If not, it is a new species. The skin is in good condition, 26 mm. long, and similar to the female skin just described. The differences are small, possibly sexual, and perhaps due to the bad condition of the female skin. The third joint of antennæ is not so much enlarged at tip, and the fourth joint is a short cone; in the female these parts are much compressed. The wing cases reach only half of segment 4. The dorsal hooks of the abdomen are equally well developed on segments 3 to 6. The middle appendage has before the apical third above on each side a rounded blackish tubercle. After all I think the male and the female belong to the same species.

7. **Ophiogomphus carolinus** (supposition).

Hagen, Oph. carolinus n. sp.

One female nympha skin, from Bee Spring, Ky., May, 1874, by Mr. F. G. Sanborn. Length 26 mm.

Body stout, moderately hairy; head cordate, little notched behind, angles rounded, globular; joint three of antennæ less than thrice the length of the two basals, flattened, bent upon tip, enlarged externally to about one-third of its length; tip rounded; fourth joint rudimentary, short, conical; mask quadrangular, a little longer than broad, narrowed at base; middle third produced in a short rounded lobe, with pavement teeth and a comb of flat scales; palpus just meeting; a short, nearly straight lobe, narrowed to the rounded tip, faintly serrate inside; movable hook sharp, slender, bent; wing cases covering part of segment 4; abdomen stout, convex above, a little more than twice as long as broad; segments 8 to 10 tapering more suddenly; segments of equal length, 10th half as long as 9th; lateral spines short, sharp on 7 to 9; dorsal hooks of equal size on 2 to 9; scars as usual; genitals marked; last segment tapering; appendages twice its length, triangular, sharp; laterals a little shorter; legs slender, posteriors reaching about segment 7; joint three of posterior tarsi longer than the two basals.

This species is evidently an Ophiogomphus, but no species of this genus was described from the Middle States. Among the described nymphæ it is nearest related to *O. colubrinus*, but this species has the third joint of antennæ shorter, broader, and the dorsal hooks visibly less developed. As now a pair of new species *O. carolinus* Hag. from North Carolina is discovered, the supposition that the larva may belong to this species is probable. Of all other known species only *O. rupinsulentis* goes as far south as New York. Its larva is still unknown.

Digitized by Google

8. **Ophiogomphus severus** (raised).

Hagen, Hayden Rep. 1873, p. 591.

Three nymphæ in alcohol from Colorado, one full grown, by Mr. Hayden, one very young by Mr. Carpenter; seven skins of both sexes from Umatilla, Oregon, June 25, and Weeksville, Mont., Aug. 2, 1882, by Mr. S. Henshaw. Length 27 to 29 mm.; young, 11 mm.

Head cordate, eyes prominent; body hairy, less on the abdomen; antennæ short; third joint less than thrice the length of the two basal ones, flat, concave above, enlarged after base, but not to the tip, which is rounded; fourth joint very short and thin, conical; mask as *O. colubrinus;* wing cases covering nearly 4th segment; abdomen half as broad as long, tapering on tip, somewhat flattened; segments of equal length, the 10th shorter; lateral spines short, on segments 7 to 9; dorsal hooks on segments 2 to 9 stronger and more exserted on segments 2 to 4; scars as usual; female genitals two small yellowish knobs; appendages less than twice the length of last segment, triangular, jointed, the laterals a little shorter; legs slender, somewhat longer than in *O. colubrinus*, third joint of posterior tarsi as long as the two basal ones.

The young nympha entirely similar, but the wing cases covering only the 2d segment.

We caught the teneral imago near the skin, and as the *O. occidentis* flying at the same time and place has been actually taken during transformation, the statement "raised" seems justified, the more as the identity of the nympha is proved by the specimens from Colorado, where no other Ophiogomphus but *O. severus* has been observed.

9. **Ophiogomphus occidentis** (raised).

Hagen, nov. spec.

Ten nympha skins of both sexes from Umatilla, Oregon, June 25th, Big Bend of Yakima River, Washington Territory, July 19, 1882, by Mr. S. Henshaw; full grown nympha in alcohol from Washington Territory opposite Umatilla June 27, 1882, by H. Hagen. Length 28 mm.

Very similar to *O. severus;* differs by lateral spines on segments 6 to 9; dorsal hooks all strongly erected, the last two with the tip bent backwards; a black dot on each side of the dorsal hooks and a row of ill defined spots more externally; lateral appendages one-third shorter than the middle one; third joint of posterior tarsi somewhat longer than the two basal ones.

This is the species of which I have given in "Nature" (No. 686, vol. 27, Dec. 21, 1882, p. 173) some notes concerning its tracks on the sand when ready for transformation into the imago state.

10. **? Ophiogomphus** spec (supposition).

Six nymphæ, not full grown, in alcohol, from the Sutledge River above Billespur, Himalaya, by Rev. M. M. Carleton, 1872. Length 23 to 20 mm.

Digitized by Google

Head cordate, eyes prominent, body hairy; antennæ short, stout, third joint less than thrice the length of the two basal ones, flat, ovoid, very little bent inwards, the apical third about half as broad as long; fourth joint rudimentary, represented by a small tubercle with a faint black dot on tip; mask one-third longer than broad, quadrangular, the basal third narrowed; middle third produced in a short rounded lobe, with pavement teeth and a comb of flat scales; palpus short, straight, somewhat narrowed to the rounded tip, very finely serrate; movable hook reaching scarcely the base of the opposite one, sharp, straight, bent a little on tip; wing cases covering the base of 4th segment; abdomen elongate, about one-third broader than long, little broader than the head, slowly tapering, segments of equal length, 10th shorter; lateral spines none except a rectangular production of segment 9; dorsal hooks on 2 to 9, less developed on segments 4 to 6; scars as usual; genital not marked; appendages twice as long as segment 10, triangular, very sharp, the laterals one-third shorter; legs short, slender, posteriors not exceeding 6th segment; third joint of posterior tarsus longer than the two basals together.

The place of this species is doubtful, the more as the want of marks of genitals may prove that the nymphæ are far from full grown; nevertheless, the principal characters are those of Ophiogomphus, differing by a little longer mask, more straight movable hook, longer more cylindrical abdomen and lack of lateral spines. There is indeed a species from Northern China described *O. spinicornis* Selys, said to be nearly related to *O. serpentinus*. As the nympha of the latter species is still unknown I feel not warranted in supposing that the described nympha may belong to the only known Asiatic species.

Sub-genus Gomphus (raised).

Selys Monogr. Gomphin. p. 115.

Body flat, broad; third joint of antennæ twice the length of the two basals; mask quadrangular, middle third of front border straight, or nearly so; palpus with a strong end hook, dentate before it; abdomen flattened, broader than the head, two to three times longer than broad, segment 9 little longer than 8; 10th shorter; lateral spines on 6 to 9, or 7 to 9; dorsal hook very faint on 9, or more developed on 3 to 9, or on 6 to 9; legs with strong hook on tibia; third joint of posterior tarsi as long as the two basal.

This group is still somewhat polymorphous, as *G. vulgatissimus* has been considered the type with *G. adelphus ?*, *fraternus ?*, *exilis minutus ?*, *furcifer ?*, and perhaps *amnicola ?* and *graslinellus ?*. To a somewhat different group, perhaps of higher value, belongs *G. spinosus ?*. Finally, two species from the Amazon and Himalaya are more different. I have avoided any farther division, as of the fifteen species described only four are raised, and as of the other ones only for few of them can a somewhat risked supposition be made.

Digitized by Google

11. **Gomphus vulgatissimus** (raised).

Selys Monogr. Gomphin. p. 128, Cabot p. 3, pl. 1, fig. 1.

Many nympha skins of both sexes from Prussia, Hanover, Bavaria, England and two nymphæ in alcohol from Bavaria and Austria raised by Rosenhauer and by F. Brauer. Length 31 mm.

Body stout, not much hairy; head cordate, notched behind, angles rounded, third joint of antennæ nearly twice as long as both basals, a little dilated, bent up at tip; fourth rudimentary; a short tubercle; mask quadrangular, channeled below, as long as broad, a little narrowed at base, middle third of front border straight, with a comb of flat scales; palpus short, arcuated, basal half finely denticulated, end hook stout, sharp; movable hook long, sharp, bent; wing cases reaching nearly 4th segment; abdomen three times longer than broad, flattened, lancet shaped, tapering, after 6th segment decreasing; segments of equal length, the 9th a little longer than 8th; the 10th one-third of the 9th, cylindrical; lateral spines on segments 6 to 9; no dorsal hooks; apical margin of 9th segment produced in middle in a very short and faint triangular tooth, which is wanting sometimes; a faint impressed median line on 5 to 8; scars as usual; genitals marked; appendages a little longer than last segment, pyramidal, sharp, laterals shorter; legs long, not very strong, posteriors reaching nearly 9th segment; third joint of posterior tarsi about as long as the two basals.

12. **Gomphus** spec.

One nympha in alcohol from Illinois, Prof. S. A. Forbes, and a very young one from Mackinaw Creek, Woodwood County, Illinois, Aug. 20, 1879. Length 27 mm.; breadth 7 mm.

Body lancet shaped, flat; antennæ, legs and side margins of abdomen very villous; head cordate, flat; ocelli visible; occiput short, notched in middle, with a triangular short lobe on each side of the notch; hind angles rounded, with several stripes; antennæ short, third joint one and a half longer than the basals, curvated; fourth a short pyramidal tubercle; mask oblong, one-third longer than broad, a little narrowed at the base; middle third of front border very slightly rounded; palpus nearly straight, tip rounded, end hook not longer than the teeth, dentated to base; movable hook long, strong, wing cases covering 2d segment; abdomen a little more than twice longer as broad, only the last segments sloping; segments of equal length, 10th one-third of 9th; lateral spines on 6 to 9 long, flat, triangular, those of 9th as long as 10th segment; side margins of 8 and 9 serrated; no dorsal hooks, segments 3 to 7 divided above, a triangular short spine on middle of apical border of 8 and 9; appendages little longer than last segment, pyramidal, pointed, the median shorter than the inferiors; the laterals one-third shorter than inferiors; legs strictly burrowing legs, the hind ones reaching 2d segment; the wing cases cover only 2d segment.

The smaller nympha, 12 mm. long, is exactly alike, only the wing cases very small. Should they belong to *G. amnicola?* This species is similar to Ophiogomphus by the front border of mask very slightly rounded and the palpus nearly without end hook, but the shape of the abdomen and the divided median dorsal segment by an impressed median line are similar to *G. vulgatissimus* The segments 8th to 9th serrated on lateral margin.

Digitized by Google

The fact that the wing cases of the larger nympha, 27 mm. long, do not cover entirely the 2d segment proves that even this nympha is still a young one, and must, when full grown, belong to a very large species.

13. **Gomphus adelphus** (supposition).

Selys Syn. Gomphin. iv, p. 52.

One full grown nympha, male, from Cambridge, Mass. Length 29 mm.

Similar to *G. vulgatissimus*, body flatter and more hairy; head cordate, notched behind, angles blunt; third joint of antennæ about twice as long as both basal, little dilated, bent up, fourth very short, ovoid; mask quadrangular, a little longer than broad, channeled a little before tip, retracted near base; middle third very slightly rounded but not produced, with a comb of flat scales; palpus short, broad, bent; a finely dentated end hook is short, stout, not much longer than the teeth; movable hook bent, long, sharp; wing cases reaching 4th segment; abdomen half as broad as long, flat, sides straight, the last four segments strongly tapering, segments of equal length, the 9th a little longer than 8th and more on its ventral side; segment 10 very short, one-fourth of the 9th, cylindrical; lateral spines on 6 to 9, the first very short, the following longer, the 9th very long and sharp, twice the length of segment 10, which appears, consequently, encased in the 9th; side margins of 9th serrated; dorsal hooks none, except a small tubercle in the middle of apex of segments 8 to 9, a little more produced on 9; scars as usual; genitals marked; appendages twice as long as segment 10, pyramidal, broad, sharp, the middle one with a tubercle on each side, laterals a little shorter; legs strong, the anteriors shorter, posteriors flattened, long, reaching 9th segment; third joint of its tarsi about as long as the two basal.

Among the few species known from Massachusetts *G. adelphus* is the only one to which it can be supposed to belong.

The nympha is very similar to the preceding one.

14. **Gomphus** spec.

Three nymphæ, the larger one probably full grown, from Cairo, Ill., July 26, 1876, Prof. Forbes. Length 18 to 23 mm.

Similar to the nympha from Newport, Ky., but surely different; body flat, limbs very hairy; third joint of antennæ longer, more cylindrical, fourth nearly black; ocelli well visible; palpus with only two incisions near the strong and sharp end hook; middle third of front margin of the mask slightly rounded; wing cases covering fully 3d segment; abdomen similar, flat, side margins very hairy; segment 9 as long as 8, 10th very short; lateral spines on 6 to 9, the last one less sharp, as long as segment 10; no dorsal hooks at all; appendages as long as segment 9, triangular, broad, not very sharp, laterals a little shorter than the middle one, which is shorter than the inferiors; legs slender, longer, posteriors reaching segment 8; end hook of anterior tibiæ short; third joint of posterior tarsi as long as the two basals.

This species, together with the following nympha from Newport, Ky., with the nympha from Cambridge (supposed *G. adelphus*) and with the European *G. vulgatissimus* have a sharp impressed dorsal line seemingly cutting the abdominal segments in two halves.

Digitized by Google

15. **Gomphus** spec.

One young nympha from Newport, Ky., by Miss Willard, 1881. Length 23 mm. Body flat, hairy; differs as follows from the nymphs supposed to belong to *G. fraternus*.

Third joint of antennæ a little longer, more cylindrical; fourth rudimentary, black; mask nearly one-half longer than broad, somewhat sloping to base; middle third straight; palpus as by *G. fraternus*, but only three strong teeth near tip; wing cases reaching 3d segment; abdomen flat, three times longer than broad, a little increasing to 7th segment, the rest tapering slowly; segment 9 one-third longer than 8; segment 10 very short, one-sixth of 9th; lateral spines on 6 to 9 sharp, the last one twice the length of segment 10; dorsal hooks none, but the apical margin of 9th segment with a broad, triangular, flat projection, in the middle as long as segment 10; appendages twice the length of last segment, triangular, broad, sharp, the laterals nearly as long as the other; legs slender, shorter, posteriors reaching segment 7, third joint of posterior tarsi as long as the two basals.

There is no clew for the species to which the nympha belongs. Perhaps it may be *G. minutus*.

16. **Gomphus exilis** (raised).

Two nympha skins, one of them raised by Mr. F. Sanborn in Worcester, Mass., May 25, 1878, and two younger nymphæ from Brookline and Salem, Mass. Length 24 to 19 mm.

Body rather slender, moderately hairy; head cordate, notched behind; angles blunt; third joint of antennæ about twice as long as both, basal little dilated, bent up, flat above, truncate on tip, fourth joint very short, ovoid; mask quadrangular, a little longer than broad, narrowed at base, front border very faintly rounded on middle third, which is not produced, with a comb of flat scales; palpus scarcely meeting, ending in a strongly bent and pointed hook with four strong teeth inside; movable hook long, slender, arcuate; wing cases reaching partly 4th segment; abdomen a little more than three times longer than broad, flat, tapering slowly after 6th segment; segments of equal length, 9th a little longer than 8th; 10th half of 9th, cylindrical, ventral margin a little produced in the middle; lateral spines on 6 to 9, the last one-third of 10th; dorsal hooks very small, pointed on 6 to 9; scars as usual; genitals marked by both sexes; appendages as long as last segment, pyramidal, broad, sharp, laterals a little shorter; legs slender, long, posteriors reaching nearly 9th segment, third joint of its tarsi scarcely longer than second.

Eleven nymphæ in alcohol from Kentucky by Mr. F. G. Sanborn; all stages from full grown 26 mm. to very young 12 mm. are very much alike to those of *G. exilis*. The head of the younger nymphæ is only half as broad as the abdomen, which is very flat; the dorsal hooks in some are indicated on segments 2 to 9. As *G. exilis* is found in Maryland it may exist also in Kentucky; the tarsi are yellow.

A full grown nympha 27 mm. long from the Potomac, Virginia, August, by Prof. Shaler I am not able to separate from those from Ken-

Digitized by Google

tucky; nevertheless the full grown ones are so much longer, broader and flatter, that they may belong to another related species.

17. **Gomphus** spec.

Selys Monogr. Gomphin. p. 125.

One nympha, perhaps nearly full grown, from Delphi, Ind., by Rev. Hill. Length 30 mm.

Very similar to *G. adelphus*; differs as follows: palpus narrower, the tip is a very sharp bent hook, inside with ten strong teeth from base to tip; middle third of mask straight; wing cases covering half of 4th segment; abdomen a little narrower, more slowly tapering; segment 9 a little longer, narrower on tip, three times longer than 10th; lateral spines on 6 to 9 longer, sharper, the last about as long as segment 10; lateral margins of 7th to 9th serrate; dorsal hooks well marked on segments 2 to 9 somewhat less elevated, but more sharply pointed; genitals not marked; appendages as long as last segment, laterals shorter; legs similar.

Though there is no proof I think the nympha may belong to *G. fraternus*, or perhaps to some nearly related species.

18. **Gomphus Graslinellus** (supposition).

Walsh. Proc. Ac. Phila. 1862, p. 394.

One female nympha skin from Loon Lake, Colville Valley, Washington Territory, July 23, 1882, by Mr. S. Henshaw. Length 30 mm.

Body flat, little hairy; head cordate, notched behind, angles globular, rounded; only the two basal joints of antennæ present; mask quadrangular, one-third longer than broad, channeled below, basal third narrowed; middle third produced in a short rounded lobe, with a comb of flat scales; palpus short, broad, on tip a sharp, end hook, below finely dentated to base; wing cases covering half of 4th segment; abdomen flat, less than three times longer than broad, the last five segments slowly tapering; segments of equal length, 9th a little longer, 10th half as long as 9th, conical; lateral spines on 7th to 9th; lateral margins of 8th and 9th serrated; dorsal hook on 4th to 9th well developed; scars as usual, genitals marked; appendages about as long as 10th segment, pyramidal, sharp, laterals a little shorter; legs strong, for burrowing; hind legs flat, long, reaching about 2d segment; tarsi wanting.

This nympha and one female of the imago were found in the same locality; no other Gomphus was found there; so the supposition seems to me warranted.

A number of young nympha, 10 to 25 mm. long, from shallow water North shore Cedar Lake, Illinois, Oct. 18, 1882, communicated by Prof. Forbes, belong to this species described by Mr. Walsh from Illinois; they agree perfectly with the nympha from Washington Territory. The third joint of antennæ twice as long as the basals together, stout, cylindrical, a little thicker before tip; fourth joint a short pyramid; the lateral spines and the dorsal hooks well developed; lateral margins of segments 8 to 9 strongly serrated, and some teeth also on 7th; third

Digitized by Google

joint of posterior tarsi as long as the two basals together. The nymphæ are of dull yellow color, segments 2 to 8 on dorsum with two divergent blackish bands, and another ill defined longitudinal one externally.

A male nympha skin 32 mm. long from Dallas, Texas, in McLachlan's collection agrees well in all characters, except that the lateral margins of segments 8 to 9 are very little serrated, but I have overlooked also this character in the dry female skin till I got alcoholic specimens. Moreover, the abdomen is less depressed, and so it looks much narrower, but this may be the effect of transformation or a sexual character; dorsal hooks sharp on segments 3 to 9; the alcoholic specimens show also a hook on third segment; nevertheless the narrower abdomen makes it not impossible that the specimen may belong to a nearly related but different species.

19. **Gomphus** spec.

One male nympha skin from Detroit, Mich., by Mr. H. G. Hubbard. Length 22 mm.

Body elongate, somewhat hairy; head cordate, notched behind, angles globular; third joint of antennæ twice the length of the two basal, cylindrical, bent up, flattened above, truncate on tip; fourth joint rudimentary, a short tubercle; mask large, a little longer than broad, sides bent up, straight in the apical half, oblique to the base, channeled below; middle third of front border straight, with a long comb of flat scales, and a short, black tooth in the middle; palpus short, broad, strongly arcuate, end hook sharp, before it a series of sharp teeth to the base; movable hook long, bent, sharp; wing cases reaching 4th segment; abdomen spindle shaped, more than thrice longer than broad, about equally rounded above and below, sloping after segment 6: segments of equal length, 9th a little longer than 8th, on tip half as broad; 10th cylindrical, half as long as 9th; lateral spines on 6th to 9th, the last half as long as 10th; dorsal hooks on 3 to 9, the last ones being sharp spines; scars as usual, genitals marked; appendages a little longer than last segment, triangular, sharp; laterals one-third shorter; legs for burrowing, rather long, hind legs reaching 8th segment; third joint of posterior tarsus as long as the two basal.

Perhaps the nympha may belong to *G. furcifer;* its shape is similar to *G. notatus*.

20. **Gomphus vastus** (raised).

Walsh, Proceed. Ac. Sci. Phila. 1862, p. 391; Cabot, p. 3, No. 4, pl. 2, fig. 4.

One male nympha skin from Rock Island, Illinois, by Mr. B. Walsh; one male skin and one female, just emerging, from Hannibal, Ill.. transforming in numbers May 27, 1872, by Mr. Charles V. Riley. Length 31 mm. The nympha was compared formerly with *G. vulgatissimus*, but it is nearer to the group of *G. notatus*, the nymphæ of which were not known at the time.

Body somewhat stout, little hairy; head cordate, less notched, angles globular; third joint of antennæ twice the length of the two basal, cylindrical, bent up,

Digitized by Google

flattened above, and a little dilated, tip truncate; fourth joint rudimentary, a small tubercle; mask oblong, one-third longer than broad, channeled below, sides bent up, base narrowed; middle third of front border straight, with longer comb of flat scales; palpus just meeting, strong, dilated, very arcuate, dentated to base, end hook long, sharp; movable hook long, bent, sharp; wing cases reaching 4th segment; abdomen stouter, less spindle shaped, more rounded above than below, a little more than thrice longer than broad, the last four segments tapering; 9th scarcely longer than 8th, half as broad on tip; last segment one-third of 9th; lateral spines on 6th to 9th, the last as long as 10th segment; dorsal hooks on 8th to 9th, short tubercles; scars as usual, genitals marked; appendages nearly twice the length of 10th; triangular, less sharp, laterals one-third shorter; legs stout, for burrowing, hind legs longer, exceeding 7th segment; third joint of posterior tarsi as long as the two basal.

Mr. Walsh stated the nympha would belong to one of four species,—*G. notatus*, *amnicola*, *vastus*, *fraternus*. The nympha of *G. notatus* is now known, and I received these skins with the imago male and female of *G. vastus* raised by Mr. Charles V. Riley.

21. **Gomphus pallidus** (raised).

Rambur.—Selys 4th Addit. Synops. Gomphin. p. 52, No. 1; Cabot, Mon. p. 2, No. 2, pl. i, fig. 3 (*G. pilipes*).

One nympha skin, female, together with the just emerged imago from Peoria, Ill., June, 1878, by Prof. A. S. Forbes; two nymphæ in alcohol from Charleston, S. C., the types of Mr. Cabot; one from Detroit, Mich., June 6, 1879, by Mr. H. G. Hubbard; four young ones from Waltham, Mass., by Mr. S. Henshaw; a female nympha skin from Dallas, Texas, in McLachlan's collection. Length 35 to 39 mm.; breadth 10 mm.

Body lancet shaped, very elongate, flat, without hairs except on limbs; head cordate, flat, eyes large; vertex transverse-oblong, ocelli well marked; on each side near the vertex a crescent furrow ending on the front angle of eye; two basal joints of antenna globular, second smaller, third nearly twice as long as the two basal ones, as thick as second, cylindrical, bent up a little, truncate on tip; fourth rudimentary, a small rounded tubercle; antennæ and anterior border of head very villous; occiput short, villous behind, very little notched behind in the middle, and with another notch on each side near the hind angles, which are semi-globular with some polished scar-like spots; mask reaching forelegs, small, oblong, one-half longer than broad, basal third a little narrowed; sides straight, bent up; middle third of front margin produced in a short rounded lobe with comb of flat scales and a prominent black tooth in middle; palpus short, just meeting, end hook rounded externally, sharp, not longer than the six or seven teeth between them and the base; movable hook long, bent, sharp; prothorax narrower than head, half as long as broad, hind part with three rounded tubercles in the middle and a larger one near the sides, somewhat pointed outwards; wing cases covering a little 4th segment: abdomen very flat, nearly thrice longer than broad, narrowing after segment 4, sloping to the more contracted segments 9 and 10; segment 9 longer than 8, its apex half a broad as its base; 10th cylindrical, half as long as 9th, only 2 mm. broad; lateral spines very short on 7th and 8th, very long,

Digitized by Google

straight, three-quarters as long as last segment on 9th; no dorsal hooks, but on 3 to 9 along the median line of segments a flattened pad covered with fine felt, ending on 9th (and much smaller on 8th) in a short, flat, triangular median spine exceeding the apical margin of the segment; scars on 3 to 8 with a black maculose streak and three black and polished spots; on 9th and less visible on 10th a longitudinal blackish line not reaching base or apex; on 3 to 8 two black transversal dots in the middle of segments; appendages less than half of last segment, pyramidal, sharp on tip, of equal length; laterals a little shorter; the genitals marked: the ventral longitudinal sutures straight, nearer together on 9th, ending on the lateral spines; lateral spaces as broad as the middle one; legs short, strong, fringed with long hairs; first legs a little shorter than second, curvate, a strong apical end hook on tibia, claws short, strong, third pair longer, the more flattened femur reaching 4th segment, claws a little longer; third joint of tarsi nearly as long as the two basals together; lateral margin of abdomen villous.

The smaller nympha 25 mm. long from South Carolina, collected by Osten Sacken and mentioned by Mr. Cabot, p. 2, has the apical spine on segments 8 and 9, and would well belong to *G. pallidus*, were not the lateral spines on 9 very short.

Prof. Forbes has dredged in Cedar Lake, Illinois, Oct. 16–18, 1882, in very shallow water and caught a number of very young nymphæ which belong surely to *G. pallidus;* length 8 to 20 mm.; more villous than the full grown; shape of body the same but flatter; occiput nearly straight behind, antennæ with fourth joint larger, more globular; middle tooth on front margin of mask visible; palpus inside with five to eight teeth; wing cases only reaching 2d segment; abdomen sloping gently to tip; 9th segment longer than 8th, the middle spine on apical margin visible; lateral spines on 7th to 9th segment, the latter ones half as long as 10th segment.

The principal characters for *G. pallidus* are the middle tooth in front margin of mask, which becomes blackish in the full grown; the teeth along the whole inner margin of palpus; the sloping of the abdomen is continuous and not suddenly stronger after 7th segment; the middle dorsal spine on apical margin of 9th; lateral spines only on 7 to 9, the latter one longer; even the youngest nympha, 8 mm. long, shows those characters, though the wing cases are justly budding and do not reach the end of segment 1; the teeth on the palpus are less in number, the lateral spines shorter.

The nymphæ represent four different moults; those long 8 to 12 mm. have six teeth on the palpus farther distant and more pointed; those 15 to 25 mm. long have seven teeth near together, but straight on tip and the inner angles sharper and rejected; the apex of the teeth somewhat notched; those long 27 mm. with eight teeth, more pointed; the full

Digitized by Google

grown nympha skins have the teeth longer, sharply pointed, divergent, the last longest; genitals marked in the nymphæ 15 mm. long and longer.

22. **Gomphus** spec.

One female nympha skin from the Tapajos River, Amazon, Thayer expedition. Length 35 mm.

Body large, stout, hairy; head cordate, about as broad as long, hind angles globular, between them two smaller tubercles; antennæ short, third joint less than thrice the length of the basal, somewhat dilated in middle, flat above, tip bent up; fourth very small, cylindrical; mask large, oblong, one-third longer than broad, sides somewhat convex, basal third a little narrowed, middle third of front border produced in a short rounded lobe with pavement teeth and a comb of flat scales; palpus strong, short, not meeting, arcuate, with a few molar incisions; end hook long, very much bent, sharp; movable hook long, bent, sharp: wing cases reaching 5th segment; abdomen stout, rounded above, one and a half longer than broad, the last three segments slowly tapering; segments of equal length, 10th conical, a little longer than 9th; lateral spines on 5 to 9, very small on 5, the other longer, very strong, divergent from the segments; dorsal hooks on 2 to 9 very strong, the last pointed; scars as usual; genitals very little marked; inferior appendage thin, sharp, as long as segment 10; laterals similar, but one-third shorter, the other wanting; legs short, strong, adapted for burrowing; hind legs flat, reaching 7th segment; third joint of posterior tarsi as long as the two basal.

A nympha skin long 24 mm. from the same locality belongs probably to a previous stage of the same species; the only differences are that the rounded middle part of the mask is more produced, nearly semi-circular; the palpus is larger, inner margin without molar incisions and convex, end hook longer, bent suddenly down at the base and the tip bent again in the opposite direction. The only skin is in bad condition, therefore the differences may be considered as accidental ones until more specimens will warrant a new species.

The species belonging to the nympha is probably not yet known.

23. **Gomphus** spec.

One nympha in alcohol from Carundahy River, Brazil, Thayer expedition. Length 22 mm.

The nympha is very much alike to those from the Tapajos River, but differs as follows: wing cases reaching third segment the nympha is apparently younger); lateral spines on segments 7 to 9; appendages as long as last segment, very sharp, the superior and the laterals of equal length, very little shorter than the inferiors; hind legs longer, reaching about 9th segment.

I would not have separated this nymphæ except for the unusual length of the lateral appendages and the smaller number of lateral spines.

Digitized by Google

Group of **G. plagiatus** (raised).

Body very elongate; head as broad as abdomen; third joint of antennæ twice the length of the two basal, flat; fourth rudimentary, a small tubercle; mask oblong, little longer than broad, little narrower at base, middle third of front border straight (very little rounded in *G. olivaceus*); palpus with a strong end hook and a few sharp teeth just before it; abdomen spindle shaped, four to five times longer than broad, about rounded, segment 9 longer than 8, to twice its length; 10th very short; lateral spines on 6 to 9; dorsal hooks none, except a flat, small, triangular apical spine on 9; apical hook on the four anterior tibiæ very small; ventral bags on segments 4 to 6.

G. plagiatus, *notatus*, *spiniceps*, *olivaceus?* form a type rather different of all other Gomphus by the long spindle-shaped abdomen, not broader than the head, the length of segment 9 and the rudimentary hooks of the anterior tibiæ. *G. olivaceus?* is somewhat different, perhaps not belonging here. Of the other species *G. vastus* is similar, but the hooks of the tibia are very strongly developed. Probably other species will belong to the group of *G. plagiatus*. The very abnormal form of the abdomen indicates, perhaps, a higher group than a sub-genus.

24. **Gomphus plagiatus** (raised).
Selys Monogr. Gomphin. p. 159.

Two nympha skins, male and female, from Crescent City, Fla.; a male nympha in alcohol, the imago, half out, from Dandridge Junction, Tenn. Length 40 mm.

Body very elongate, little hairy; head cordate, deeply notched behind; eyes large, prominent, hind angles globular, rounded; antennæ short, third joint twice the length of the two basal, cylindrical, a little thinner than second, bent up, fourth rudimentary, a rounded knob; mask oblong, one-third longer than broad, channeled below; sides bent up, oblique; basal third a little narrowed; middle third of front border nearly straight, with a very short comb of flat scales; palpus short, strong, arcuate, with a strongly bent sharp end hook, and three molars just before it; movable hook long, bent, sharp; wing cases reaching nearly 4th segment; abdomen five times longer than broad, spindle shaped, as broad as head, very slowly tapering; rounded above, less below, where the middle part between the longitudinal sutures is broader than the lateral parts; segments of equal length, 9th not fully twice as long as 8, tip half as broad as base, 10th very short, cylindrical, as long as broad; lateral spines on segments 6 to 9, sharp, long, on 9th half longer than 10th segment; dorsal hooks none, except on 9th a flat, apical, triangular spine as long as segment 10; scars as usual; genitals marked; ventral segments 2 to 8 with a round elevation for the ganglia; appendages as long as segment 10, triangular, sharp, laterals very little shorter; legs comparatively small, the anteriors burrowing legs; hind legs short, reaching end of segment 5; third joint of posterior tarsi about as long as the two basal, first joint much shorter than second.

Digitized by Google

25. **Gomphus notatus** (*fluvialis* Walsh) raised.

Selys Monogr. Gomphin. p. 159.

One male nympha skin from Detroit, Mich., raised by Mr. H. G. Hubbard; eight in alcohol half to full grown from Cairo, Ill., July 26, and Pekin, Ill., October 9, by Prof. A. S. Forbes; one female nympha skin from Crampton, Mass., by F. G. Sanborn. Length 25 to 35 mm.

Similar to *G. plagiatus;* head cordate, strongly notched behind, angles globular; ocelli visible; third joint of antennæ twice the length of the two basal, cylindrical, flattened above, bent up; fourth rudimentary, a small tubercle; mask oblong, one-third longer than broad, channeled below on apical half; sides bent up; basal third a little narrowed; middle third of front border nearly straight, with a very short comb of flat scales; palpus short, strong arcuate, with a strongly bent sharp end hook and three quadrangular teeth just before it; movable hook long, bent, sharp; wing cases covering half of 4th segment; abdomen nearly four times longer than broad, spindle shaped, as broad as the head, tapering, rounded above, less below; segments of equal length, 9th about one-third longer than 8th, conical; segment 10 very short, cylindrical, half as long as broad; lateral spines on 6 to 9, the last one as long as 10th, triangular, blunt at tip; dorsal hooks none; a flat, apical, triangular spine on 9th not exceeding the apical margin of the same segment; scars as usual; genitals marked; appendages a little longer than last segment, triangular, not very sharp, laterals very little shorter; legs short, hind legs longer, exceeding 6th segment; third joint of tarsi about as long as the two basal, first nearly as long as second; antennæ and legs very hairy.

The specimen from Massachusetts is very similar, but somewhat stouter, abdomen larger, less rounded, segment 9th hardly longer than 8th, its apical dorsal spine only indicated; lateral spine less than half the length of 10th. If it should belong to another species, I do not know to which; at least the imago could not be smaller than *G. fluvialis.*

26. **Gomphus spiniceps** (raised).

Walsh Proc. Acad. N. Sci. Phila. 1862, p. 889; Cabot, p. 5, No. 8, pl. ii, fig. 1.

Two nympha skins, male and female, taken in transformation, the male half out of the skin, at Lawrence, Mass., July 4, 1867, by Mr. F. G. Sanborn. Length 41 mm.

Body very elongate, very narrow, little hairy; head large, cordate, as broad as abdomen, about straight behind, angles blunt, with broad but low tubercles, third joint of antennæ twice as long as the two basal, very little larger on tip, bent, somewhat flattened above; fourth rudimentary, a short tubercle; mask large, a little longer than broad, channeled below, sides bent up, a little narrowed at base, middle third of front border straight, with a short comb of flat scales; palpus short, strong, very arcuate, end hook strong, bent, sharp; just before it two strong teeth; wing cases reaching nearly 4th segment; abdomen spindle shaped, slender, more than four times longer than broad, very slowly tapering after 4th segment, strongly convex above, a little less below; segments of equal length, 9th twice the length (6 mm.) of 8th, a little narrowed in middle, 10th very short (1 mm.) cylindrical; lateral spines on 6 to 9 short, not sharp, the last one-half as long as 10th, no dorsal hooks except a very short, flat, triangular, apical spine on 9th;

Digitized by Google

scars as usual, on 9th long, linear; genitals marked; appendages as long as 10th segment, short, cylindrical, not very sharp, the laterals scarcely shorter; legs short, strong, for burrowing; hind legs a little longer, reaching about end of 5th segment; third joint of posterior tarsi as long as the second; apical hook on anterior tibiæ very small; femur with a strong apical hook internally.

G. spiniceps is very similar to *G. plagiatus*, but the legs are shorter and stronger, the abdomen more slender and slower tapering, lateral spines shorter. The hook on anterior tibia in *G. plagiatus*, *notatus*, *olivaceus?* is as small as in *G. spiniceps*.

27. **Gomphus olivaceus?** (supposition).

Selys Syn. Gomphines iii, p. 21, quart.

One male nympha skin in alcohol from Great Salt Lake, Utah, by Mr. Garman. Length 32 mm.

Very similar to *G. notatus;* body somewhat hairy, third joint of antennæ wanting; mask more oblong, basal third narrower; front border in middle third produced in a short rounded lobe, with a very short comb of flat scales; palpus similar to *G. notatus;* abdomen a little broader, more lancet shaped; segment 9 a little longer than 8, with a very short apical spine above; lateral spines on 6 to 9, the last one blunt, half as long as segment 10, which is very short, cylindrical; scars as usual; the rectum with part of the intestinal apparatus retained in the skin; ventral pockets in segments 3 to 5 small, triangular; appendages similar, rather blunt; legs similar.

The rounded middle lobe of the mask, the somewhat broader abdomen, the shorter lateral spine on segment 9 are the principal differences. It seems probable that this nympha belongs to *G. olivaceus*.

Sub-genus Cyclogomphus? (supposition.)

Selys Monogr. Gomphin. p. 105.

Body flat, similar to *G. vulgatissimus*, third joint of antennæ twice the length of the two basal, hardly thicker, flat, bent up; fourth very small, conical: mask one-third longer than broad, sides oblique, base one-third narrower than front; the middle third of front border produced in an elliptical lobe with a deep rectangular cleft; abdomen flat, lancet shaped, segments of equal length, 10th half as long; lateral spines on 5 and 9; no dorsal hooks; legs more slender, less fit for burrowing; hooks on the four anterior tibiæ rudimentary, nearly wanting.

The cleft of the lobe of the mask is entirely abnormal; the lack of developed hooks on the tibiæ is also abnormal. Both characters together seem to indicate for this species a rather higher position than a sub-genus. That the species belongs to Cyclogomphus is only a supposition.

28. **? Cyclogomphus** species.

Cabot p. 5, No. 7, pl. ii, fig. 2.

Seven nympha in alcohol, probably not full grown, some younger; from Ghugger Pir, Himalaya, by Rev. M. M. Carleton. Length 23 to 17 mm.

Digitized by Google

Body flat, elongate, not very hairy; head cordate, little notched behind, angles blunt, oblique; antennæ short, third joint about twice the length of the basal ones, hardly thicker, flat, bent up, smaller on tip, fourth very small, conical, black; mask one-third longer than broad, deeply channeled below, sides sloping to base, which is one-third narrower than front; middle third produced in an elliptical lobe, half as long as broad, with a deep rectangular cleft, and with a comb of flat scales, except in the cleft; palpus a strongly bent sharp hook, with a few molar incisions; movable hook long, sharp, bent; wing cases reaching 4th segment; abdomen flat, lancet shaped, tapering gradually, dorsum slightly rounded; segments of equal length, the last half as long; segments 5 to 9 with sharp lateral hook spines, the last one-third of segment 10; no dorsal hook; scars as usual, light brown; female genitals marked by two small darker spots; appendages a little longer than 10th segment, pyramidal, not very sharp, the laterals one-third shorter, the middle one in some males with two tubercles before tip; legs longer, more slender, hind legs reaching 7th segment, third joint of posterior tarsus about as long as second; hooks on anterior tibiæ rudimentary nearly wanting.

The largest of the nymphæ shows that a change of skin is imminent, though the female genitals begin to be marked they are all apparently not full grown. The principal character is the largely notched lobe of the mask. I have (Cabot, p. 16) advanced the supposition that the nymphæ may belong to Cyclogomphus, which is, nevertheless, uncertain, except for geographical reasons.

Sub-genus ? EPIGOMPHUS (supposition).

Selys Monogr. Gomphin. p. 84.

Body more elongate, Aeschna like, third joint of antennæ more than three times longer than the two basal, straight, little dilated, fourth very short, ovoid; mask small, once longer than broad, sides oblique, base nearly half as broad as front border, the middle third of which produced in a round lobe with two teeth; abdomen four times longer than broad, flat, very gradually narrowing to tip, segments of equal length, 10th even a little longer than 9th; lateral spines on 7 to 9, dorsal hooks on 3 to 9.

The very unusual length of the last segment, the length of the third joint of antennæ and the unusual occurrence of two somewhat prominent teeth near the middle of the rounded lobe of the mask, which is also longer and narrower than in any other species seem to indicate for this species a higher position than a sub-genus. That the species belongs to Epigomphus is still a supposition, but a rather probable one.

29. **Epigomphus ? paludosus ?** (supposition).

Cabot, p. 1, No. 1, pl. 1, fig. 2.

A full grown nympha (Cabot's type) from Rio Macaros, Brazil, Thayer expedition. Length 34 mm.

Body Aeschna like, elongate, hairy; head cordate, hind angles globular, between them two smaller tubercles; third joint of antennæ more than thrice the length

Digitized by Google

of the two basal, straight, a little dilated, bent up at tip; fourth joint very short, ovoid; mask small, once longer than broad, sides oblique, bent up, front border less than twice the breadth of base, middle third produced in a rounded lobe, edged with pavement teeth and two small, black, longer teeth in the middle and with a comb of flat scales; palpus small, scarcely meeting, end hook sharp, strong, arcuate, longer than the nearly straight margin, which is provided with ten teeth; movable hook long, sharp, arcuate; wing cases reaching 4th segment; abdomen elongate, four times longer than broad, very gradually narrowing to tip, somewhat rounded above, flatter below (the figure is too broad at the base); segments of equal length, 10th very little longer than 9th, cylindrical, narrower at tip; dorsal hooks on segments 3 to 9, thicker on segment 3, nearly obliterated (accidentally?) on 6, longer and sharper on 7 to 9; lateral spines on 7 to 9; scars as usual, genitals not marked; appendages long, sharp, pyramidal, inferiors as long as segment 10, middle one a little shorter, basal half thickened above, laterals one-third shorter than the inferiors; legs short, strong, formed for burrowing; hind legs longer, flatter, reaching 7th segment; third joint of posterior tarsi as long as the two basal, which are of equal length.

There is from the same collection a very young larva, length 15 mm., the wing cases only marked; antennæ and mask similar; abdomen much more hairy, less elongate, more suddenly tapering, lateral spines on segments 8 to 9; dorsal hooks just visible; appendages similar; legs longer, more hairy. There is no doubt that the larva belongs to the same species.

The nympha was formerly supposed to belong to Herpetogomphus, as then this genus contained the only known species from Brazil. The discovery of the nymphæ of Herpetogomphus, one raised, and the discovery of several species in Brazil representing different forms, proves that the nympha does not belong to Herpetogomphus, but perhaps to some of the newly discovered species.

Among the four Gomphus known from Brazil the elongate form of the nympha would agree best to *E. paludosus*.

II Legio GOMPHOIDES.
Selys Monogr. Gomphin. p. 189.

Of the four genera belonging to the Legio Gomphoides all are known except Zonophora. The three known genera belong to entirely different types, and perhaps it will be more natural to drop entirely this Legio, the more so as the imagos form also a motley crowd, and so dissolve it in three co-ordinate groups.

Progomphus, with its Aeschna like body, the middle legs less distinct than the forelegs, and the ventral sutures ending on 8th segment is very different from all other Gomphina; the prothorax-stigma is covered.

Gomphoides with its slender spindle-shaped abdomen, the unusual length of the much more slender 10th segment, and the small mask is also unique among Gomphina; the prothorax-stigma is free.

Digitized by Google

Hagenius with its very flat and large circular abdomen, with the unusual large, flat, circular third joint of antennæ and the very long legs can scarcely be united with the other ones; the prothorax-stigma is free.

Finally, the two abnormal nymphæ from Kentucky and Japan are out of question till the imago is known.

In fossil layers the insects of the sub-family Gomphina belong to the oldest Odonata; among them the Legio Gomphina is the last to appear. Probably what we know now of the Legio Gomphoides, represents only isolated remnants of genera in former times largely developed. The links are lost, or not yet known.

Genus Progomphus (supposed).

Selys Monogr. Gomphin. p. 194.

The nymphæ of Progomphus differ by some striking characters from all other belonging to the Legio Gomphoides. The head is large, flat, square, as large as the bulky thorax and the abdomen; the fourth joint of antennæ is about one-fourth as long as the third; the small but more elongated mask is produced on the front border in a rounded large lobe; the flat scales of the comb somewhat distant from each other; abdomen tapering slowly from the base, less rounded above, with dorsal hooks on segments 1 to 9; lateral spines from 5 to 9, or 3 to 9; last segment conical, free; appendages sharp, the laterals very short; abdomen below flat, the two longitudinal sutures ending on each side on the apical angle of segment 8th (instead of 9th, as in all other species); the middle legs nearer together at base than the forelegs; the legs are very strong burrowing legs, short and thick; the tarsi knife shaped. The position of the middle legs and the ventral sutures are alone sufficient to separate the nymphæ from all related ones, especially from Onychogomphus. The covered stigma of the prothorax is similar to Gomphus and separates Progomphus from the other genera of the Legio Gomphoides.

30. **Progomphus obscurus** (supposition).
Selys Monogr. Gomphin. p. 201; Cabot, p. 6, pl. ii, fig. 3.

Three nymphæ in alcohol, male and female, probably full grown, from Wareham, Mass., May, 1863, by Prof. L. Agassiz; one in alcohol from Little Wabash River, Effingham, Ill., June, 1878, Prof. S. A. Forbes. Length 27 to 30 mm.; breadth 6 mm.

Stout, hairy, Aeschna like: head large, as broad as abdomen, flat, cordate, notched behind, angles globular: antennæ stout, third joint very hairy, long, dilated, more than twice the length of the two very short basal, fourth joint short,

Digitized by Google

thin, conical, strongly recurved, about one-fourth the length of the third joint; mask extending to forelegs, narrow, oblong, half as broad, somewhat enlarged at front border, the middle third produced in a semi-circular lobe, with a long comb of flat scales; palpus just reaching, nearly straight, rounded on tip, smooth inside; movable hook short, bent, sharp; prothorax nearly as broad as head, large, transverse-oval; wing cases exceeding a little segment 4th; abdomen Aeschna like, three times as long as broad, flattened below, rounded above, tapering from 5th segment; segments of about equal length, the two basal a little shorter, 9th a little longer; dorsal hooks on segments 1 to 9, the three basal very strong, the following much smaller; lateral spines on 5 to 9; scars as usual, encircled behind by a brown border; base of segments on each side with two triangular brownish spots; longitudinal ventral sutures ending at the apex of 8th segment, the middle space a little longer; segments 2 to 8 on each side with a brown crescent band; appendages longer than 10th segment, triangular, very sharp, laterals less than half shorter; legs stout, very strong, hairy, typical burrowing legs; tibias thick after base, bent up at tip, without apical hook; middle legs nearer at base than forelegs, hind legs nearer at base than forelegs, hind legs widely separated, reaching nearly 8th segment, third joint of tarsi longer than the two basal, claws long, sharp; the claws of four anterior legs blunt.

As *P. obscurus* has now been collected near Boston, by Mr. Morrison, there can be scarcely a doubt, that the nymphæ belong to this species.

31. **Progomphus** spec.

Cabot, p. 7 (note at the end).

A female nympha from Carundahy, Brazil (Cabot's type), a nympha from Rio dos Macacos, Brazil, four nymphæ from Rio Negro, Amazon, two young, all in alcohol, from Thayer expedition. Length 20 to 25 mm.

The later discovery of the other nymphæ from Brazil proves that there has been no mistake in the label, as was supposed, when Mr. Cabot published the monograph of Gomphina. Nevertheless, even to-day with so much more material before me I am at loss to find structural differences. The nymphæ from Brazil are indeed less bulky and more slender and the lateral appendages rather shorter, only one-third of the laterals; until now *P. obscurus* has not been found in Brazil, and it seems probably that these nymphæ belong to a different species.

32. **Progomphus** spec.

Six nymphæ in alcohol young and some probably full grown from Santiago, Cala., by Mr. G. R. Crotch, 1872. Length 20 to 27 mm.; breadth 7 mm.

These nymphæ are so similar to *P. obscurus*, that it is difficult to separate them; but all have lateral spines on segments 3 to 9 instead on 5 to 9. The black spots above on abdomen are larger; the ventral segments 6 to 10 have transversal basal black bands, enlarged to the lateral margins; the abdomen a little broader.

Digitized by Google

Perhaps the nymphæ belong to *P. zonatus*, or to *P. meridionalis*, n. sp. from Arizona, as a similar nympha 24 mm. long was collected by R. Crotch, San Diego, Cala.

Genus GOMPHOIDES (raised).

Selys Monogr. Gomphin. p. 206.

The principal character of the nymphæ of Gomphoides is the unusual length, one-third to nearly one-half of the abdomen, and lankness of the 10th segment. As far as yet known this character is unique among all Odonata. The very slender spindle shaped abdomen, about three-quarters of the whole body has the ventral sutures ending on the apical angles of 9th segment; anal appendages very short, of equal length; the four anterior legs equally distant.

There are two different groups represented; one (Cyclophylla?) has the front border of the narrower mask produced in a large rounded lobe with a long dense comb of scales and the palpus as a short, thin, sharp hook; lateral spines on 7 to 9. The other (Aphylla?) has the front border of the larger mask produced in a very short rounded lobe with a very short and wide comb of bent up pointed scales; lateral spines rudimentary and only on 9th segment. The mask of both reaches half way between fore- and middle legs; prothorax stigma free.

Of the thirty-two known species only three nymphæ are known; one of them just casting the skin proves that the nymphæ belong to this genus.

33. **Gomphoides** spec. (raised).

Cabot, Gomph. p. 8, No. 10, pl. i, fig. 5.

One male nympha, just beginning to transform in alcohol, from Santa Cruz, Brazil, Thayer expedition. Length 37 mm.; breadth 6 mm.

Body long, slender; little hairy; head large, about as broad as the thorax, cordate, notched behind; eyes large and prominent; ocelli well developed; antennæ short, inserted in a kind of trumpet-like inflation on each side of the inferior ocellus; the two basal joints globular, third twice as long, strong, dilated, bent up a little, with long and dense hairs, fourth very short, linear, recurved; mask reaching half way between fore- and middle legs; breadth half the length, enlarged in front, the middle produced in a large rounded lobe, with a long comb of dense, flat scales; palpus a short, thin, sharp hook; movable hook similar but longer; wing cases reaching middle of 4th segment; abdomen long, spindle shaped, venter less rounded than dorsum, tapering slowly to end of 9th segment; segments of about equal length; 10th very long, nearly one-third of abdomen, very thin, nearly cylindrical; short lateral spines on 7 to 9; dorsal hooks on 2 to 7, strongest on 3d, short but sharp on the following, only indicated on 8 to 9; scars as usual; genitals indicated; ventral sutures ending on the apical angles of seg-

Digitized by Google

ment 9, middle space a little larger; anal appendages very short, pyramidal, sharp, all of equal length; legs short, very hairy; the four anteriors about equally distant, hind legs more separated; femora arcuated, tibiæ straight, longer, second joint of tarsi knife shaped, claws very short, blunt; hind legs more slender, longer, reaching 6th segment, third joint of tarsi as long as the two basal. claws longer, pointed.

The only specimen is beginning transformation; head and thorax are split as usual, but not yet taken out, only the base of the wings is beginning to show outside the wing cases. In lifting a little the skin of the thorax it is to be seen that the thorax of the imago before the wings is blackish, perhaps dark greenish, on each side with a pale divergent band. In fact the parts are similar to those of several Gomphoides. It was stated that perhaps the nympha may belong to *Aphylla brevipes*, which species has segment 10th as long as segment 9th, but this supposition is rather improbable, since the nympha supposed to belong to *A. producta* was discovered I think it may belong to Cyclophylla. The abdomen of the imago still in the abdomen of the nympha is pale with two dorsal longitudinal blackish bands.

34. **Gomphoides** spec.

Cabot, Gomph. p. 9, No. 11.

Three female nymphæ in alcohol from Rio dos Macacos, Brazil, Thayer expedition. Length 31 to 35 mm.

Not full grown; very similar to the specimen from Santa Cruz; differs by the fourth joint of antennæ stronger and longer; by the want of the trumpet-like inflation for the insertion of antennæ: by well developed dorsal hooks on 2 to 9; the dorsal hook on segment 2 is a tubercle (just as in the other species), the third strongest, all the other nearly equally developed.

In comparing the two species perhaps some allowance is to be made for the fact that the first species is just transforming. Perhaps the shorter fourth joint of antennæ and even the trumpet-like inflation may be the consequence of the extraction of the antennæ of the imago, for the seta is to be seen in the third joint of the nympha. But as the dorsal hooks are sharp, short, horny spines, they cannot disappear during transformation. Therefore the three younger nymphæ seem to belong to a different species.

35. **Aphylla producta** (supposition).

Selys Monogr. Gomphin. p. 230.

Two nympha skins, male and female, from Crescent City, Fla. Length 58 mm.; breadth 8 mm.

Body slender, very elongate. very little hairy; head large, about as broad as the body, cordate, deeply notched behind, eyes very large, globular behind; a polished elongate spot before each of the posterior ocelli, four polished round spots on occiput, the two interiors smaller; antennæ inserted in a trumpet-shaped inflation,

Digitized by Google

which is nevertheless depressed except on tip; the two basal globular, third joint less than thrice as long, cylindrical, bent up, scarcely thicker on tip, hairy below; fourth very small, short, linear; mask reaching half way between fore- and middle legs, large, one-third longer than broad, narrowed to base, a little more in basal third, channeled below, sides bent up; middle third of front border produced in a small short rounded lobe, with a short comb of bent up, pointed, more distant scales: palpus short, broad, with slender bent down end hook and four teeth before nearly as long and as strong as the end hook; movable hook long, arcuate, sharp; wing cases reaching end of third segment, margins with long hairs; abdomen very long (45 mm.), spindle shaped, tapering slowly to end of 9th segment; venter less rounded, lateral margin thickened; segments of nearly equal length, 9th a little shorter; 10th very long (18 mm.), not full half the length of abdomen, very thin (1.5 mm.). cylindrical; lateral edge of segments 7 to 9 below with a thin fringe of long hair, lateral spines only on segment 9, very short and blunt; sharp dorsal hooks on 2 and 3, on 4 to 9 a broad apical rounded tubercle, sometimes with a very small short spine; scars with several spots and a superior, short, oblique, snow-white band; genitals marked; ventral sutures ending on the apical angles of 9th segment; middle space nearly twice as large as the laterals; anal appendages very short, about as long as segment 10 is broad, of equal length; laterals black, very sharp, apical half narrower, the three other blunt, pale, membranaceous, the basal half of the middle appendage of male above thickened, triangular and horny black as the laterals; legs short, moderately strong, hairy, four anteriors equally distant, hind legs more separated; four anteriors burrowing legs, claws short, sharp, arcuate, hind legs longer, more slender, reaching 6th segment, third joint of tarsi as long as the two basal; claws sharp, long, less arcuate.

Aphylla producta is not yet recorded from Florida, but as it is very common in Cuba, the supposition is very probable, if the nymph belongs at all to a known species.

Genus **Hagenius** (raised).

Selys Monogr. Gomphines p. 238.

The prominent characters of the nymphæ are the broad, short, circular, very flat abdomen, the flat, large, circular third joint of antennæ, which is cut straight internally and therefore very approximate to the opposite one, the large, flat, running legs, the hind ones much longer than the abdomen, and the middle legs more separated at base than the forelegs; prothorax stigma free. The nymphæ of *H. brevistylus* and *japonicus* look so different from all nymphæ of Odonata, that there is no mistake possible; to a certain manner they are mimicked by Macromia, The distance of the legs, the ventral sutures of abdomen, and the lateral suture, which is entirely ventral and separated from margin to a considerable extent, exclude the nymphæ of Hagenius from Gomphus.

The supposed nymphæ of *H. ? nanus* is apparently related to Hagenius, but differs by the elongate third joint of antennæ, mask and palpus, the

Digitized by Google

more oblong abdomen, the shortness of legs, which are real burrowing legs with a strong apical hook of tibiæ, wanting by Hagenius.

The nymphæ from Kentucky have antennæ of Hagenius, mask and palpus of *H. nanus*, legs of the same, but the distance of the two anterior pairs equal, abdomen of Gomphus with ventral sutures and last segment of *H. nanus*. The discovery of the imago is very desirable, to fix the position of the nympha.

36. **Hagenius brevistylus** (raised).

Selys Monogr. Gomphin. p. 241; Cabot p. 9, No. 12, pl. iii, fig. 4.

I have seen a large number of nymphæ, very young till full grown, dry or in alcohol, and several nymphæ skins. A dozen is still before me from Orono, Me., Massachusetts, New York, Kentucky, Kansas, male and female. The species was raised by T. W. Harris; one nympha with the imago half out was presented to the collection by Prof. Fernald; similar ones by other students. Length 12 to 40 mm.

Body very flat, about circular, not hairy; head large, flat, cordate, as broad as long; between the antennæ a narrow projection, with rectangular notch on tip and sharp angles, inserted in which is a cordate tubercle; eyes a little before the hind part of head, moderately large, rather conical; side part of head below and before the front angle of the eyes protracted near the mouth in a triangular lobe; vertex flat, ocelli visible, small, near each of the hind ones a larger elongate flat spot, and two smaller ones before the anterior ocellus; occiput short, but large, separated from the forehead by a suture uniting the sharp inner angles of the eyes and the well marked posterior margin of eyes; hind border of occiput straight, a little notched in middle, median suture well marked, on each side a small conical tubercle; lateral hind angles pyramidal, strongly elevated; antennæ short, the two basal joints cylindrical, first once broader than long, the second merely annular; third joint a large flat disc, circular, three times broader than the first, the inner edge cut straight, border somewhat elevated; fourth joint rudimentary, represented by a very small black spine in the swollen anterior border of third not far from the apical angle; the third joint is covered, less below, with short flat scales, longer on the inner border; similar scales cover the basal joints, more or less the head, occiput and prothorax; mask square, sides bent up, base a little narrowed; front border slightly convex, middle third a little more produced, with pavement teeth; above with a short but thick comb of flat scales; palpus short, a flat broad lobe, rounded on tip, finely serrated within; movable hook longer, arcuate, sharp; prothorax narrower than head, excavated, more than twice as broad as long, straight before, a little rounded behind, sides bent up; a transversal suture separates the front part; wing cases reaching 6th segment; abdomen very large, exceedingly flat (4 mm. high by 25 mm. long), more than twice broader than head, nearly circular on young and half grown specimens, a little longer than broad (23 mm. long: 20 mm. broad) on full grown; the first three segments tapering to base, the three last to tip; segments 1 and 2 very short, 3 to 9 nearly equal (2.5 mm. long; 20 mm. broad), 10th very short, inserted entirely in a quadrangular excision of 9th; the outer edges of segments 2 to 9, which are in fact the lateral spines, form a sharp-edged border, separated from the abdomen by a ven-

Digitized by Google

tral suture; the posterior border of the edges is oblique, but on segments 6 to 8 with a rounded lobe before tip; on 9th the edges are as long as segment 10 and close to it; the segment 10 on each side with a short, blunt, apical protraction; dorsal hooks on segments 2 to 10, but varying much in size and elevation; on the last 2 to 4 segments they are often represented by a more or less strong median ridge, though the basal segments have mostly very strong hooks; scars in the middle of segments, the dorsal part between the scars lancet shaped and slowly higher towards the middle (about 4 mm.), the marginal part of the abdomen outside the scars about 1 mm. thick; venter flat; the two longitudinal sutures parallel, divergent on segments 2 and 9, ending externally of the apical angles of 9th; middle space about half as broad as the laterals; stigmata near the middle of base of lateral spaces on 2 to 8 are very small, but larger on 8th; ventral bags triangular, on base of segments 4 to 6 somewhat externally of the stigma; genitals marked; the whole margin around the abdomen edged with a fringe of scales; anal appendages short, stout, pyramidal, blunt, a little longer than 10th segment, superior somewhat shorter, channeled at sides, lateral very small, half as long as the others; legs long, flat, slender, formed for running; legs widely distant, middle ones more separated at base than forelegs; a sharp, elevated, transversal ridge on each side with a strong spine on the prosternum and the mesosternum, and a triangular hook on the under side of the coxa of the four anterior legs; forelegs shortest, edged with flat scales, femora flattened, tibiæ angular, longer than femora, tarsi less than half as long as tibiæ; middle legs a little longer than forelegs; hind legs very long, much longer than abdomen, femora reaching 7th segment; tibiæ a little shorter; tarsi half as long as tibia, third joint as long as the two basal; claws long sharp, less arcuate than on the other legs.

37. **Hagenius japonicus** (supposition).

Selys Monogr. Gomphi. p. 244; Cabot p. 10, No. 13, pl. iii, fig. 5.

One male nymph not full grown, dry, from Kanagawa, Japan, by Mr. Gulick. Length 28 mm.

Very similar to *H. brevistylus*, differs as follows: part between the antennæ less notched, inserted tubercle ovoid, third joint of antennæ less rounded, more angular externally; tubercles on occiput and hind legs blunt, very much less elevated; the sides of prothorax more blunt; abdomen straighter at sides and behind, more oblong, 9th segment shorter, its lateral angles not so sharp; dorsal hooks less developed, after 5th segment forming an elevated ridge; anal appendages shorter, sharper, superior not so deeply channeled at sides, before tip (which is not broken as presumed in Cabot's description) two very small polished tubercles; laterals one-third as long as inferiors; ridges on prosternum and mesosternum; its lateral spines and the hooks of coxa nearly wanting.

Though this species is very similar to *H. brevistylus*, the differences quoted seem to justify the separation. The doubt of De Selys (Odonates du Japon, 1883, p. 115) about the existence of *H. japonicus* in Japan, because he had not seen specimens in the collections from Japan except the type is apparently to be dismissed as the described nympha is surely from Japan.

Digitized by Google

38. **Hagenius? nanus** (supposition).
Selys Gomphin. Synops ii, Additions p. 37, No. 84, bis.

One young nympha in alcohol from Yeddo, Japan, by Prof. E. Morse. Length 15 mm.; breadth 7 mm.

Body flat, elongate, very hairy; head large, flat, broader than long, about oblong, between the antennæ a short, broad projection, nearly straight on tip; eyes small, round in the middle of sides; front angle before eyes conical; occiput large, straight behind, angles rounded, sides scarcely elevated; antennæ short, the two basal joints small, globular, third a little more than twice as long, flattened, bent up, a little dilated externally in middle, more than twice as long as broad; fourth short, black, conical; mask large, longer than broad, sides sloping to base, which has half the breadth of the front; middle third a short rounded lobe with a short comb of flat scales and four black short teeth on tip, palpus a flat broad lobe, rounded on tip, inside finely dentate; movable hook long, sharp, arcuate; prothorax smaller than head, transverse-oval, side angles rounded; wing cases reaching nearly apex of third segment; abdomen very little elevated above, half as long as broad, oblong, the 9th segment tapering suddenly; segments of equal length, 9th a little shorter in middle; 10th very short, inserted entirely in a broad deep rounded notch of 9th; lateral spines sharp on segments 7 to 9, the last one as long as segment 10; no dorsal hooks; venter flat, the two sutures as in *H. brevistylus*, the middle space a little smaller than the laterals; anal appendages short, twice as long as 10th segment, pyramidal strongly pointed, the laterals less than half as long as the inferiors; legs short, fit for burrowing; middle legs very little more distant than forelegs; the four anteriors with thick, strong, curvate, femora and tibiæ, the last ones with a strong external hook on tip; hind legs flat, reaching nearly 8th segment, third joint of tarsi as long as the two basal; legs very hairy, hairs very long.

This remarkable nympha is young, and some allowance will have to be made for this fact. Nevertheless I have compared it with nymphæ of *H. brevistylus* of the same size. The legs of *H. brevistylus* are running legs, tip of tibiæ without hook, middle legs equally more separated as the forelegs, than the hind legs compared with middle legs; the hind legs of the youngest nymphæ longer than the body. The abdomen of *H. nanus?* is more oblong; the third joint of antennæ less flat, elongate, the fourth conical; the mask has four black teeth; the head is somewhat similar, but the sculptures wanting or less finished; the nympha is very hairy. I do not know *H. nanus* described after one female; perhaps the nympha belongs to this species—if it is not a young nympha of Chlorogomphus.

39. **Uropetala Thoreyi?** (doubtful supposition).
Selys Monogr. Gomphin. p. 375.

Six nymphæ, young, in alcohol from Rocky Creek, near Gregson's Spring, Kentucky, Oct. 20, 1874, by Mr. F. G. Sanborn and F. W. Putnam. Length 15–20 mm.; breadth 5–6 mm.

Digitized by Google

Body elongate, moderately flat, very little hairy, except on legs; this extraordinary nympha combines head and antennæ of *Hagenius* with legs and abdomen of Gomphus; head flat, a little broader than long, between antennæ an oblong projection with a round notch on tip and sharp angles, inserted in which a cordate tubercle; eyes similar to *H. brevistylus*, more rounded, side part of head before front angles of eyes straight, not produced; ocelli visible; occiput similar, no tubercles, hind angles conical, not elevated; antennæ similar, but third joint broadest a little before middle, the apical half of the external margin more straight; mask similar to *H. nanus?* but the produced lobe less rounded, comb longer; the four teeth similar; palpus similar to *H. nanus?*, but instead of finely dentate, with six strong arcuate teeth, the last one on tip; prothorax as by *H. nanus?*; wing cases reaching 4th segment, with several black dots; abdomen a little elevated above, once longer than broad, a little narrower at base, enlarged to 6th segment, the following tapering; segments of equal length, 10th very short, about one-third of 9th, inserted nearly entirely in a deep rounded notch of 9th; lateral spines on 8th and 9th segments sharp, the last one a little shorter than segment 10; no dorsal hooks; lateral margin of last segments bent up a little, finely serrated; anal appendages of *H. nanus?*; venter slightly rounded, the two sutures as by *Hagenius*, a little less divergent on 9th segment; middle space a little larger than the lateral ones; legs short, fit for burrowing, very hairy; fore- and middle legs equally distant, femurs thick, bent; tibiæ with a strong external apical hook; hind legs wider separated, short, scarcely reaching 6th segment, flat, tibiæ shorter than femur, tarsus as long as tibia, third joint as long as two basal, claws long, sharp, bent at tip; abdomen above with ill defined brown markings; each side of the median line three black basal dots on most segments.

This remarkable nympha has the head and antennæ of *Hagenius*, the ventral sutures and mask, except palpus, of the supposed *Hagenius nanus*, the distance of middle legs, the abdomen, except last segment of Gomphus. The species to which the nymphæ, which are collected in winter, and therefore young (perhaps very young), belong is not known. It is, of course, possible that the imago is not yet known, but this is somewhat improbable, as just in this part of Kentucky many excellent collectors have been collecting. Perhaps it may be the nympha of *Uropetala Thoreyi*, which is there by no means rare. At least I know no other species to which it can be supposed to belong.

III Legio LINDENIA.

Genus Ictinus (supposition).

Selys Monogr. Gomphin. p. 263.

The nymphæ of Ictinus though similar to *Hagenius* by the large rounded abdomen and hind legs longer than the abdomen, differ by important characters from *Hagenius* and all other groups.

The hind legs have only two jointed tarsi, whereas all other Gomphina have three joints. The longitudinal ventral sutures are straight, but divergent on the 2d and 9th segments as in *Hagenius*. Besides

Digitized by Google

these longitudinal sutures there are in all Gomphina transversal ones indicating the end of the segments. Now Ictinus has an oblique additional suture on each side of segments 7 and 8 in the lateral space of the venter. This suture begins on the lateral edge on the base of the lateral spine (a little before the end of the segment) and runs to the middle of the lateral space of the foregoing segment, forming a triangular additional part. It would be easy to accept this additional part as the indication of the large lateral leaf on the imago, but this leaf occurs only on the 8th segment, besides that the additional suture is wanting in other Gomphina with lateral leaves. On segments 3 to 6 the additional triangular part is inflated with an impressed rim below, ending just where the ventral bags are situated, but here no suture is visible, and the ventral bags are (in one specimen) visible only on 4 to 6; similar impressions are on the sides of abdomen of *Aphylla*. The head is large, and has between the antennæ a flat projection as *Hagenius;* the under side of head is projected below the eyes, so as to be seen from above, and similarly projected near the mouth parts; the occiput is large and separated from the front by a suture; antennæ with third joint thinner than second, cylindrical, a little flattened above; mask large, sparse, middle third more or less produced with teeth and comb; palpus short, broad, hooked, inside with teeth; movable hook not very long; prothorax saddle shaped, stigmata not covered; abdomen strongly roof shaped, with a crest of dorsal hooks and sharp lateral spines; apical margin of segments 7 to 8 notched; last segment inserted in 9th; hind legs longer than body, front legs fit for burrowing; base of legs successively wider distant; prothorax stigma free.

After all, Ictinus forms a group well characterized and different from all others.

40. **Ictinus præcox** (supposition).
Cabot p. 11, pl. 1, fig. 4.

Five nymphæ, not entirely full grown and younger ones, all females from the Sutledge River, middle Himalaya, and one from East Jumna out of holy tank, near Delhi, in alcohol, by Rev. M. M. Carleton. Length 21 to 16 mm.; breadth 12 to 8 mm.

Body short, stout, roof shaped, similar to *Hagenius*, about circular; head large, cordate, divided by a straight transversal suture behind the eyes, which are moderately large, triangular, rather prominent; between the antennæ a small square projection, with rectangular notch on tip and sharp angles, inserted in which is a short transversal tubercle; ocelli visible; occiput behind the transversal suture about as long as the front part, hind border nearly straight, angles blunt, well rounded; head beneath at each side with a small prominent tubercle below the

Digitized by Google

eyes and projecting a little more than the eyes, so that the tip is visible from above; antennæ shorter than head, joint one globular, two smaller, annular, three very hairy twice as long as the two basal, cylindrical, straight, not thicker than second, but a little increasing to tip, which is bent up a little and blunt; fourth very short, conical; mask extending between forelegs, large, flat, square, basal fourth a little narrowed, sides bent up; middle third of fore border produced in a rounded short lobe, with a short comb of scales, and on each side with seven short, dark teeth; palpus just meeting, arcuate, moderately sharp pointed, inside with about a dozen dark teeth similar to those of the mask; movable hooks not very long, sharp, arcuated; prothorax a little narrower than head, transverse oval, half as long as broad, side angles rounded; wing cases reaching 4th segment; abdomen large, nearly circular, more than twice broader than head, broadest at 7th segment, somewhat rounded below, strongly roof shaped above; segments 1 to 5 short, 6 to 9 longer, 7th and 8th about twice as long as the basal ones, 10th very short, inserted entirely in a large obcordate excision of 9th; the lateral edges of segments 2 to 9 as in *Hagenius*, separated by the ventral suture, forming lateral spines on segments 4 to 9 successively larger, triangular, sharp, longest on 7th; the lateral edges with long hairs, but on 7 to 9 with a comb of strong, arcuate, sharp spines; lateral border of 9th very oblique, the spines longer than last segment; dorsal hooks on 2 to 9, the basal ones smaller and separated, 6th to 9th on the whole length of segment forming a sharp dorsal crest; anal appendages short, stout, triangular, hairy, a little longer than last segment, laterals one-third shorter than the others, very sharp, more than the others; scars large, four round polished spots on each side of the middle line; dorsum roughly granulated; ventral sutures only a little divergent on 8th, more divergent on 2d segment; middle space about half as broad as the laterals; ventral bags small on 4 to 6?; segments 7 and 8 with a kind of additional ventral suture, beginning short before the lateral spine and going oblique to the foregoing segment, not reaching the longitudinal ventral sutures; legs long, hairy, not very strong; forelegs less distant than middle legs, hind legs widely separated; the four anterior legs equal, femur stronger, bent; tibia straight, with an apical exterior hook, tarsi short; hind legs longer than abdomen, femur straight, reaching 7th segment, tibia shorter: tarsus one-third shorter, only two jointed (as on the anterior legs), basal joint very short, claws long, bent on tip; the apical margin of the 8th ventral segment between the longitudinal sutures is slightly bisinuated; and just in the middle are two very small but sharply divided tubercles, which represent always the female genitals. I have not seen any male.

That the nymphæ belong to *Ictinus* is sure, as in East India no other genus of the group exists; perhaps it may belong to *I. præcox*. There is in the collection a dry specimen from the collection of the late Dr. W. Schneider, in Breslau, Prussia, said to be from Brazil. The specimen is 23 mm. long; wing cases reaching half of 7th segment; it is a male, and the only one seen. The specimen is alike to the Himalaya ones, and the figures by Cabot except 4*d* and 4*e* are from this specimen. I should believe it to be more prudent to accept the locality Brazil as doubtful, till more specimens arrive. There exists a species of *Ictinus* (*I. latro* Er.) in British Guyana, collected by Sir R. Schomburgk, in the Museum of

Digitized by Google

Berlin. The locality is doubted in the Monogr. Gomphines only for geographical reasons, as the same species is found in Asia and Polynesia, but the specimen in the Berlin Museum is surely from British Guyana.

41. **Ictinus** spec (supposition).

Three younger nymphæ, in alcohol, females; two from the Sutledge River, middle Himalaya, and one from East Jumna, out of the holy tank near Delhi, by Rev. M. M. Carleton, all together with the nymphæ of the foregoing species. Length 12 to 21 mm.; breadth 8 to 11 mm.

Very similar to the foregoing species, differs as follows: front part of head just behind the antennæ externally prolongated in a strong conical process; prolongation of the lateral part of the head just beneath the eyes stronger, visible from above outside of the eyes; occiput shorter, considerably notched behind, angles less rounded; tubercles near the notch stronger; mask produced in middle part of front border in a longer rounded lobe, with a dozen teeth on each side; palpus inside with only seven to eight smaller incisions nearer to tip, basal part smooth; abdomen more convex beneath, after segment 7 shorter, the margins of 9th segment less oblique; lateral spines on 4th to 6th longer, sharper; on 9th very short, blunt; lateral edges of segments 7 to 9 without a comb of strong, arcuate spines, only hairy; anal appendages shorter, more blunt.

There can be no doubt that these nymphæ belong to a different species though collected together with the other ones. I have no clue to a supposition.

42. **Ictinus pugnax?** (supposition).

Selys Monogr. Gomphin. p. 290.

One dry male nympha by Mr. Livingston, collected on his first voyage through S. Africa, locality not given; presented by him to the late Prof. J. Wyman, and by the Professor to the Museum. Length 28 mm.; breadth 15 mm.

Very similar to the nympha of *I. præcox*, but for some characters more similar to the other species from East India; stout; head large, cordate; tubercle projecting beneath the eye visible from above, connected with the projecting tubercle near the mouth by a concave ridge; antennæ short, with an external projection near base, third joint thinner than second, straight, twice the length of the two basal, cylindrical, somewhat flattened above; fourth a very short tubercle; mask square, rather broader than long, middle third of fore border produced in a nearly semi-circular lobe with pavement teeth and a short comb of scales and some longer hairs on each side; palpus very strong, apical half blackish, short, arcuate, hooked at tip, inside with several molar incisions in the middle; movable hook sharp, arcuate, not reaching the base of the opposite one; occiput shorter than the front part, rough, nearly inserted in the eyes, widely notched behind, hind angles bent up, a smaller tubercle on each side of the middle; prothorax narrower than head, saddle shaped, anterior part an elevated ridge, side angles bent up, in middle of hind border a square tubercle; wing cases reaching half of 7th segment (therefore the nympha may be nearly full grown); abdomen ovoid, broadest at end of 7th segment, flattened below, strongly roof shaped above; segments 1 to 5

Digitized by Google

short, 6 to 9 longer, 7 and 8 longest, with the apical dorsal margin widely notched; 10th short, inserted entirely in a large obcordate excision of 9th; lateral spines on 4 to 9, longest and sharpest on 7th; short, blunt on 9th; lateral edges of 7th to 9th with a thick comb of very short hairs; 8 to 9 with a basal bunch of longer hairs on the edge; dorsal hooks on 2 to 8, the basal ones small, sharp, 6 to 8 forming a dorsal crest, which is marked very little on base of 9th; anal appendages very stout, short, blunt, the laterals a little shorter, but as blunt as the others; abdomen above rough, covered densely with very short scales; scars without them, four rounded dark spots on each segment; ventral sutures as in other species; legs similar, not very strong; femur of posteriors reaching 7th segment; the male genitals are indicated on segments 2 and 3 and on 9.

There is no doubt that the nympha belongs to *Ictinus*, and as *I. pugnax* is the only species known from S. Africa, the nympha may belong to this species.

43. Genus? species.

Cabot, Aeschina p. 31, No. 24, pl. iii, fig. 3.

Male nympha, dry, from Laguayra, Venezuela and from Chili, in Prof. Rosenhauer's collection. Length 37 mm.; breadth 13 mm.

I may not repeat here the very detailed description published in 1881. This curious nympha was referred to Gomphina at first, with which it agrees more in general appearance than with *Aeschnina*. The 3-jointed tarsi and slender antennæ are like *Cordulegaster*, from which, however, it is excluded by the different shape of mask, which again refers it to *Aeschnina*. The antennæ are only 5-jointed.

After all I confess that it seems scarcely to belong to *Aeschnina*. Perhaps it belongs to *Petalia* or to *Phenes*.

Sub-family CORDULEGASTRINA.

Hagen, Synopsis Odonata of America, Proc. Bost. Soc. Nat. Hist. xviii, p. 50.

The nymphæ of the sub-family of Gomphina are quite polymorphous, nevertheless all agree in some important characters. The mask is flattened, and its tip never surpassing the margin of the labrum; the palpus is narrow, and when closed lying upon the plate inserted below in the margin of labrum, which forms a kind of cap; the eyes are lateral and distant more or less from the front angle of head; the antennæ are 4-jointed, the third very large, fourth rudimentary; the tarsi of the four anterior legs never 3-jointed; body and abdomen more flat.

The nymphæ of the sub-family of Cordulegastrina differ diametrically in all those characters. The mask is large, spoon shaped, covering the anterior part of head, labrum and front, lying, when closed, in the deep groove made by the projecting anterior part of the front with the nasus; the labrum is similar to that of the imago, its anterior margin hairy

Digitized by Google

without internal plate; the palpus is very large, triangular, with deep and irregular incisions, forming about a dozen of teeth of very different size and length, the opposite ones closely fitting into one another; therefore the palpi do not meet in a straight line; the eyes are globular on the anterior angle of head, with an internal triangular projection, more finely facetted; the antennæ are slender, 7-jointed, the third to seventh forming a thin seta; all tarsi are 3-jointed; the abdomen above nearly cylindrical, tapering, like a Sphinx chrysalis; flat below.

There can be scarcely a greater difference of characters between two groups, and the separation of Cordulegastrina as a sub-family of co-ordinate value to Gomphina seems to be fully justified. The nymphæ of Chlorogomphus, Petalia, Petalura, Phenes, are not yet known, and speculations upon their affinity would be out of place.

Genus CORDULEGASTER (raised).

Selys Monogr. Gomphin. p. 303.

The principal characters are given above; the prothorax stigma is large, open and entirely uncovered; the longitudinal ventral sutures of abdomen end on the apex of segment 8th, somewhat distant of the lateral angles; there exists on 9th segment a longitudinal groove imitating the sutures, but I have ascertained positively that there is no suture; small ventral bags seem to be in segments 3 to 6. The nymphæ of Cordulegaster are so very much alike to some of the Libellulina, that they are only to be separated from them by the palpus not meeting in a straight line. The nymphæ of the species of Cordulegaster are very much alike and difficult to be separated; *C. bidentatus* and *C. dorsalis* have no lateral spines, the other known species have lateral spines on segments 8 and 9; the relative length of third joint of antennæ seems to be a specific character. The split of the skin of the head by the change into the imago goes through the eyes just as in the Gomphina.

44. **Cordulegaster bidentatus** (raised).

Selys Monogr. Gomphin. p. 339; Cabot p. 14, No. 17, pl. iii, fig. 1.

Hagen Stettin. Entom. Zeit. xiv, p. 265; Brauer Neur. Austriaca p. 15, Nympha.

Two females raised Vienna, Austria, by Dr. Brauer, and Graubuendten, Switzerland, by Prof. Zeller.

Male and female in alcohol from Kooloo, Himalaya, by Rev. M. M. Carleton. Length 43 to 35 mm.; young male 27 mm.

Large, stout, with long hairs, but not densely; head large, breadth twice its length, sides rounded, running semi-circularly to occiput, so that the hind border of head is half the width of the fore border: eyes with a small, orbicular, prominent globe on the front angles of head, triangularly prolongated inside to the ver-

Digitized by Google

tex; this part is connected insensibly by a furrow with the prominent globe and also facetted, therefore the eyes are in fact very large, though probably only the small globe serves for vision in the nympha stage, as its facets are very much larger; the part behind the eyes is separated by a sharp, defined, curvate line, rough by fine tubercles; on each side a rounded flat spot, a smaller one in the middle, and a large ill defined one each side on the hind angle; all those spots are entered from behind by some irregular lines formed by fine tubercles; vertex round, small, convex, with ocelli, the lateral ones more defined; front border of head between antennæ forming a semi-circular plate, strongly prominent, when seen from below, with a comb of long, flat spines; antennæ as long as head, 7-jointed, tapering, slender; the two basal joints short, thicker, second a little longer; the other joints form a tapering, slender seta; third joint as long as fourth to sixth; the last four joints of equal length, seventh pointed; nasus transversal, strongly surpassed above by the front lobe, forming with it a deep groove, to which the palpus of the mask reaches; labrum short, very broad, deeply notched on front margin, sides rounded; mask longer, extending a little beyond middle legs, triangular, very little longer than broad; sides bent up, sloping to base, which is about one-fourth as broad as the front part; the middle third produced in a large triangular lobe, hollowed beneath at base, with two strong teeth on tip and a comb of short scales on each side; palpus large, triangular, very much enlarged at inner border, deeply denticulate, the denticulations of the opposite palpi closely fitting into one another; movable hook short, sharp, slender; prothorax less than half the length of head, and two-thirds of its breadth with a small lobe in middle; front part a transversal lobe; hind part raised, bisinuated; stigmata large, narrowed; wing cases reaching 5th segment; abdomen as broad as head, long, three-fifths of body, cylindrical above, flattened beneath, broad one-third of its length; segments of nearly equal length, 8th to 10th shorter, tapering to tip; apical margin of segments with long hairs; lateral spines on 9th very short, but every where among the long hairs are intermixed heavy spines; inferior anal appendages twice as long as 10th segment, pyramidal, very sharp; the middle one a little shorter; all with apical half bent down a little; lateral ones very short, half the length of segment 10, very sharp; abdomen below covered with fine, short, hairs; longitudinal sutures straight, ending on 8th segment, space between them four times broader than lateral space; female genitals representing two approximated conical lobes reaching 10th segment; legs very hairy, flattened, strong, formed for running; at base widely and equally separated; tibiæ about as long as femora; tarsi 3-jointed; hind legs reaching 8th segment; claws sharp; numerous spines on the under side of legs.

A younger male from Kooloo 27 mm. long is similar; on each segment near the middle of dorsum a black eye-spot on each side, represented by darker spots on the female; male genitals indicated by the usual impressions on segments 2, 3 and 9.

The nympha raised by Dr. Brauer has the superior middle appendage one-half the length of the inferiors (laterals by Cabot p. 14, is an error for inferiors) and blunt.

The second female raised by Prof. Zeller has the superior middle appendage similar to the other specimens, so that Dr. Brauer's specimen

Digitized by Google

represents a deformity. I received from Kooloo two female imago of *C. brevistigma* Monogr. Gomphin, p. 329, considered by me years ago to be only *C. bidentatus*, which seems to be corroborated by the nymphæ from Kooloo. At least I am unable to find any differences. A detailed description of the nympha raised by Dr. Brauer is given by me in Stettin. Entom. Zeit. 1853, xiv, p. 265, by Dr. Brauer Neur. Austr. p. xv, and by Cabot p. 14. Comparing these descriptions with the new one given above no difference will be found. Prof. Zeller's specimen arrived only in 1876.

45. **Cordulegaster dorsalis** (supposition).
Selys Monogr. Gomphin. p. 347.

Two full grown female skins by Mr. J. Behrens, and one half grown male, dry, by Mr. H. Edwards all from California. Length 43 to 27 mm.

The full grown skin is very similar to *C. bidentatus*, but the body less bulky, the head narrower, its sides more rounded to occiput; third joint of antennæ shorter; abdomen narrower; no lateral spines.

As there is only one species known from California and the Northwestern States, the nympha may belong to *C. dorsalis*.

46. **Cordulegaster annulatus** (raised).
Selys Monogr. Gomphin. p. 333; Cabot p. 14, pl. iii, fig. 3.
Hagen Stettin. Ent. Zeit. xiv, p. 265.

A female nympha skin, raised by Mr. McLachlan, England; a dry nympha, half grown; from Luenburg, Hanover, by Mr. Heyer. Length 40 mm. and 30 mm.

Dark brown, hairy; large, stout; head large, breadth twice the length; sides straight; the posterior half rounded, running semi-circularly to occiput, which is half as broad as the fore border; eyes forming a small, orbicular, prominent globe on the front angles, inside prolongated to the vertex; the prolongation is triangular, separated by a slight furrow from the globe and has finer facets; the part behind the eyes is separated by a sharply defined curvate line, and rough by small flat tubercles, which are more numerous along the sides and crowded behind the eye-globe, having there the appearance of flat scales; on each side near the median suture a rounded spot and a larger ill defined one near the lateral margin; the latter one with some irregular lines; vertex small, rounded, the lateral ocelli more defined; front border between the antennæ semi-circular, flat, prominent, with a comb of long flattened spines; antennæ as long as head, 7-jointed, slender, tapering, inserted in a cylindrical socket as large as first joint; the two basal joints short, thicker, second a little longer; third joint longer than fourth and fifth together; the last four joints short, of equal length; seventh sharply pointed; the point of it imitating an additional joint; mask like *C. bidentatus*; the margin of palpus forming three large teeth, lacerated by indentures forming a number of smaller teeth; prothorax like *C. bidentatus*, but a little less broad; wing cases reaching 4th segment; abdomen as broad as head, long about three-eighths of

Digitized by Google

body, rounded above, but not cylindrical as *C. bidentatus*, more flattened beneath: four apical segments tapering and shorter; apical margin of 6 to 9 concave; short, strong, lateral spines bent down on tip on 8 and 9; all apical margins with a dense fringe of long hairs, also the sides very hairy; anal appendages not full twice as long as 10th; tip sharp, bent down; the middle one nearly as long as inferiors; lateral ones not full as long as 10th, conical, tip sharp, bent down; abdomen below covered with fine, short hairs; longitudinal sutures straight, space between them four times as broad as the lateral space; female ovipositor conical, bifid nearly to base, a little flattened below, reaching 10th segment; legs very hairy, the inferior margin with numerous spines; tibiæ about as long as femora; tarsi a little shorter; claws sharp.

The nympha from Luenburg, Hanover, described and figured by Mr. Cabot, is only 30 mm. long, about half grown; the supposition that this nympha belongs to *C. annulatus*, is now corroborated by the raised nympha. The statement by Mr. Cabot p. 14, "not to be distinguished from *C. Sayi*," was the result of insufficient material. *C. annulatus* differs from all N. American species by the sides of head straight behind the eyes, the third joint of antennæ longer than fourth and fifth together, the lateral spines on 8th and 9th segments and the lateral appendages strong, sharp, bent down or better incurvate on tip.

47. **Cordulegaster diastatops** (supposition).

Selys Monogr. Gomphines p. 320.

Cordulegaster Sayi Cabot p. 13, No. 15, pl. iii, fig. 2.

Two young nymphæ, dry, from Cambridge, Mass.; six in alcohol from Bethel, Me., male, female, very young, 10 mm. long to half grown (?) 25 mm. long; one female in alcohol from Maryland by Osten Sacken; one from Pennington Gap, Cumberland Co., Va., by H. G. Hubbard, August, 1879; two about full grown females from Chicopee, Mass., R. H. Wheatland, July 1, 1860, long 40 mm. Length 10 to 40 mm.

Body more slender, very hairy; head half as long as broad; sides running semicircularly to occiput, differing from *C. bidentatus* by a little notch just behind the eye, after which the very strong and somewhat projecting curve begins, ending nearly angular at the narrow occiput; the internal angle of eyes reaches nearly the vertex; antennæ with third joint very little longer than second, fourth to seventh shorter, nearly equal; joint three shorter than four and 5 together; abdomen more slender, segments 8 and 9 with strong lateral spines; feminal genitals appearing first in nymphæ 23 mm. long; tip of appendages bent down very little; wing cases of very young ones not exceeding the segments of thorax, otherwise similar to *C. bidentatus*. I am not sure if large specimens from Chicopee belong here, except the somewhat broader head no differences are found.

When Mr. Cabot described this species I did not know that *C. Sayi* was a different species from *C. diastatops* (*C. lateralis*). I confess that some nymphæ could as well belong to *C. maculatus*, at least those from Chicopee; all others look entirely alike.

Digitized by Google

48. **Cordulegaster obliquus** (supposition).

Selys Monogr. Gomphin. p. 349.

One male nymphæ skin by Boll from Dallas, Texas, in McLachlan's collection. Length 44 mm.

The only nympha is not in very good condition; similar to *C. annulatus*, but the head partly broken; the mask narrower; the abdomen broadest in the middle, longer; segments 8 and 9 with a short, straight lateral spine; appendages not full twice as long as 10, tip sharp, very little incurved; the middle one shorter than the inferiors; lateral ones as in *C. annulatus*.

As Mr. McLachlan has received from Boll the imago of *C. obliquus* from Dallas, and as this species is at present the only one known from Texas, the supposition seems very probable. The description will be more detailed when complete specimens are at hand.

A Bibliographical and Synonymical Catalogue of the North American CYNIPIDÆ, with description of new species.

BY WILLIAM H. ASHMEAD.

Jacksonville, Florida.

(Paper No. 6.)

My aim in presenting this Catalogue of the North American Cynipidæ, is to show our present knowledge of the forms of this interesting hymenopterous family; to bring together all the described North American species, and to place them as far as possible in their proper genera, so that they may the more readily be identified.

The arrangement of the genera of the *phytophagous* Cynipidæ, is that proposed by Dr. Gustav Mayr, in his "*Die Genera der gallenbewohnenden Cynipiden*," with the exception that I have thought it advisable to still continue to separate the *Psenidæ* from the *Inquilinæ*.

The classification of the *parasitic* Cynipidæ is still very imperfect and will require a thorough revision.

It is hoped, however, that the list of the described North American forms here given for the first time, will induce students to pay more attention to their collection, so that larger and better series may be collected and thus enable a more satisfactory classification to be made in the near future.

In an appendix the new species will be found described.

Digitized by Google

AUTHORS AND WORKS CITED.

Adl.—Adler in Zeitschrift für vessens Zool. vol. xxxv, 1881.

Adl. et Licht.—Adler and Lichtenstein. Les Cynips I, Introd. Generat. alternante, suive de classification des Cynipides. Montpellier, 1881.

Ashm.—Ashmead, Wm. H. On the Cynipidous Galls of Florida with descriptions of new species. Papers Nos. 1, 2 and 3 in Proceedings Entomological Section Acad. Nat. Sci. Phila. 1881.

On the Cynipidous Galls of Florida with descriptions of new species No. 4, in ditto 1885.

Bass.—Bassett, Homer F. Descriptions of several supposed new species of Cynips, in Proceedings Entomological Society Phila. vol. iii, 1863.

Descriptions of several new species of Cynips and a new species of *Diastrophus* in ditto vol. iv, 1864.

Galls found on Plants of the genus *Rubus* in "Canadian Entomologist," vol. ii, 1870.

New Species of Cynips in ditto vol. xiii, 1881.

Description of a new species of Cynips in "American Naturalist," vol. xv, 1881.

List of the North American Cynipidæ in ditto vol. xvi, 1882.

Arrangement of Cynipidæ by Dr. Mayr in ditto vol. xvi, 1882.

Dahlb.—Dahlbom, A. G. Monog. Onychia och Collaspidia. Tvenne nya Inseckt Slägter, 1842.

Skandinavisk Hymenopter Fauna I. Galläple Flugor, 1846.

Dalm.—Dalman, J. W. Analecta Entomologica, 4to, Holmiæ, 1823.

Fitch.—Fitch, Dr. Asa. Second Report on the Noxious and other Insects of New York in Transactions of New York State Agricultural Society vol. xv, 1855.

Fifth Report, etc., in ditto vol. xviii, 1851.

Sixth Report, etc., in ditto vol. xix, 1859.

Först.—Förster, A. Verh. des Naturwissenschaftlichen Vereins Preuss. Rheinland vol. xvii, 1860.

Zoolog.-botanischen Gesellschaft. Wien. 1869.

Giraud.—Giraud, Dr. J., in Zeitschrift für die Entomologie ii. 1840; in ditto vol. iii, 1841.

Enumeration des Figitides de l'Autriche, Vienne, 1860.

Hartig.—Hartig, T. Zeitschrift für die Entomologie ii, 1840; in ditto iv, 1843.

Zoolog.-botanischen Gesellschaft. Wien. 1859.

Harris.—Harris, Dr. Wm. Insects Injurious to Vegetation, third edition, 1862.

Hald.—Haldeman, Prof. S. S. Proceedings Academy Natural Sciences Phila., vol. iii, 1850.

Hal.—Haliday, A. H., "Entomological Magazine" vol. iii.

Latr.—Latreille, Prof. Pierre Andre. Histoire naturelle générale et particulière des Crustaces et des Insectes in vol. xiii, 1802-5.

Genera Crustaceorum et Insectorum, etc., vol. iv, 1806-9.

Licht. - Lichtenstein, Jules *vide* Adler.

Linn. Linnaeus, Charles de. System Naturæ 1789. ed. 1748.

Mayr.—Mayr, Dr. Gustav. Die Einmiethler der mitteleuropaischen Eichengallen, Wien, 1872.

Die genera der gallenbewohnenden Cynipiden, 1881.

Die Europaischen Arten der gallenbewohnenden Cynipiden, 1882.

Nort.—Norton, E. in Proceedings Entomological Society Phila., vol. i, 1861.

Digitized by Google

O. S.—Osten Sacken, Baron. On the Cynipidæ of the North American oaks and their galls in Proceedings Entomological Society Phila., vol. i, 1861.

Additions and corrections to a paper entitled "On the Cynipidæ of the North American Oaks and their Galls," in ditto vol. ii, 1862.

Contributions to the Natural History of the Cynipidæ of the United States and their Galls (Article 3d) in ditto vol. iii, 1863.

Contributions to the Natural History of the Cynipidæ of the United States and their Galls (Article 4th) in Transactions American Entomological Society Phila., 1865.

Contribution to the Natural History of the Cynipidæ of the United States and their Galls in ditto vol. iii, 1870.

Prov.—Provancher, Mon. L'Abbe. Faune Canadienne Hymenopteres, Fam. vi, Cynipides in Le Naturaliste Canadien vol. xii, Quebec, 1881.

Reinh.—Reinhard in Entomologisch Zeitung, 1865.

Say.—Say, Thomas. Say's "American Entomology," edited by John L. LeConte, M.D. vol. ii.

Walsh.—Walsh, Benj. D. On Dimorphism in the Hymenopterous genus Cynips with an appendix containing hints for a new classification of the Cynipidæ, including descriptions of several new species, etc., in Proceedings Entomological Society Phila. vol. iv, 1864.

Galls and their Architects in American Entomologist vol. i, St. Louis, 1868.

Galls and their Architects (second article) in ditto vol. ii, 1869.

Westw.—Westwood, Prof. J. O. "Magazine of Natural History," vol. vi, 1833; in ditto vol. viii, 1835.

Guèrin's "Magazine of Zoology," 1837.

"Introduction to Modern Classification of Insects," vol. ii, 1840.

CATALOGUE.

CYNIPIDÆ.

Division I.—**PSENIDÆ**, or True Gall-makers.

DRYORHIZOXENUS, Ashmead.

Belonocnema, Mayr.

floridanus, Ashm. Proc. Ent. Soc. 1881, p. xxv.

Belonocnema Theatæ, Mayr. Die Gen. d. Gallenbw. Cynip. p. 16.

RHODITES, Hartig.

dichlocerus, Harris (*Cynips*) Ins. Mass. 3d Ed. p. 549; (*Rhodites*) Osten Sacken Proc. Ent. Soc. Phil. vii, p. 42.

bicolor, Harris (*Cynips*) l. c. p. 548; (*Rhodites*) Osten Sacken l. c. p. 49.

ignota, O. S. l. c. p. 49.

rosæ, Linn. (*Cynips*) Sys. Nat. ii, 917; (*Rhodites*) Hartig Zeitschr. f. d. Ent. ii, 1840 p. 194.

radicum, O. S. l. c. (ante) p. 46.

verna, O. S. l. c. p. 49.

Digitized by Google

DIASTROPHUS, Hartig.

nebulosus, O. S. l. c. p. 36.
cuscutaeformis, O. S. l. c. p. 39.
radicum, Bass. Can. Ent. vol. ii, p. 98.
turdigus, Bass. l. c. p. 99.
potentillæ, Bass. Proc. Ent. Soc. Phil. iii, p. 689.
similis, Bass. Can. Ent. vol. xiii, p. 19.

ANTISTROPHUS, Walsh.

pisum, Walsh, Am. Ent. vol. ii, p. 74.

TRIBALIA, Walsh.

batatorum, Walsh, Proc. Ent. Soc. Phil. iii, p. 470.

AMPHIBOLIPS, Reinhard.

spongifica, O. S. (*Cynips*) Proc. Ent. Soc. Phil. ii p. 244.
coccineæ, O. S. l. c. p. 242.
nubilipennis, Harris (*Cynips*) Ins. Inj. Veg. p. 434; Fitch Rep. 2nd, No. 318.
inanis, O. S. (*Cynips*) l. c. ante i, p. 61.
coelebs, O. S. (*Cynips*) l. c. p. 61.
ilicifoliæ, Bass. (*Cynips*) l. c. iii, p. 682.
formosa, Bass. (*Cynips*) l. c. p. 679.
sculpta, Bass. (*Cynips*) l. c. ii, p. 324.
phellos, O. S. (*Cynips*) l. c. i, p. 70.
cinerea, Ashm. (*Cynips*) Proc. Ent. Soc. 1881, p. xix.
racemaria, Ashm. (*Cynips*) l. c. p. xxvi.
citriformis, Ashm. (*Cynips*) l. c. p. xxviii.
fuliginosa, Ashm. (*Cynips*) l. c. 1885, p. vii.
melanocera, n. sp.

ANDRICUS, Hartig.

S. G. *CALLIRHYTIS*, Förster.

agrifoliæ, Bass. (*Cynips*) Can. Ent. vol. xiii, p. 53.
Suttoni, Bass. (*Cynips*) l. c. p. 54.
californicus, Bass. (*Cynips*) l. c. p. 51.
capsula, Bass. (*Cynips*) l. c. p. 101.
conigerus, O. S. (*Cynips*) Proc. Ent. Soc. Phila. ii, p. 251, vol. v, p. 358.
seminator, Harris (*Cynips*) Ins. Inj. Veg. p. 548; Fitch, Rep. 2d N. Y. State Agr. Soc. p. 315.
similis, Bass. (*Cynips*) Proc. Ent. Soc. Phila. iii, p. 685.
futilis, O. S. (*Cynips*) l. c. pp. 63–64.
tumifica, O. S. (*Cynips*) l. c. v, p. 683.
scitula, Bass. (*Cynips*) l. c. iii, p. 683.
clavula, Bass. (*Cynips*) l. c. p. 685.
operator, O. S. (*Cynips*) l. c. ii, pp. 256–57.
palustris, O. S. (*Cynips*) l. c. i, p. 63.
nigræ, O. S. (*Cynips*) l. c. i, p. 66.
tuber, Fitch (*Cynips*) Rep. 2d N. Y. State Agr. Soc. p. 309; Bassett, Proc. Ent. Soc. Phila. iii, p. 685.

Digitized by Google

modesta, O. S. (*Cynips*) l. c. i, p. 66.
notha, O. S. (*Cynips*) l. c. p. 58.
podagræ, Walsh (*Cynips*) Proc. Ent. Soc. iii, p. 492.
futilis, O. S. (*Cynips*) l. c. i, pp. 63–64.
papillatus, O. S. (*Cynips*) l. c. p. 64.
quercifoliæ, n. sp.

S. G. *ANDRICUS*, Hartig.

tubicola, O. S. (*Cynips*) Proc. Ent. Soc. i, p. 60.
singularis, Bass. (*Cynips*) l. c. ii, p. 326; Walsh, vol. ii, p. 485.
Osten Sackenii Bass. (*Cynips*) l. c. p. 327.
ventricosus, Bass. (*Cynips*) l. c. iii, p. 681.
lana, Fitch (*Cynips*) Fifth Report. No. 316.
confluens, Harris (*Cynips*) Ins. Inj. Veg. p. 433; O. S. Proc. Ent. Soc. i, p. 57.
petiolicola, Bass. (*Cynips*) Proc. ii, p. 325.
fusiformis, O. S. (*Cynips*) l. c. i, p. 61.
flocci, Walsh (*Cynips*) l. c. vol. iv, p. 482.
ignotus, Bass. (*Cynips*) Can. Ent. vol. xiii, p. 106.
cinerosus, Bass. (*Cynips*) l. c. p. 110.
utriculus, Bass. (*Cynips*) l. c. p. 78.
californicus, Bass. (*Cynips*) l. c. p. 51.
pomiformis, Bass. (*Cynips*) l. c. p. 74.
Pattoni, Bass. (*Cynips*) l. c. p. 98.
Coxii, Bass. (*Cynips*) l. c. p. 112.
papula, Bass. (*Cynips*) l. c. p. 107.
batatoides, Ashm. (*Cynips*) Proc. Ent. Sec. 1881, p. xi.
foliatus, Ashm. (*Cynips*) l. c. p. xiii.
lanigera, Ashm. (*Cynips*) l. c. p. xiii.
Catesbæi, Ashm. (*Cynips*) l. c. p. xv.
Turnerii, Ashm. (*Cynips*) l. c. p. xvi.
rugosus, Ashm. (*Cynips*) l. c. p. xviii.
medullæ, Ashm. (*Cynips*) l. c. 1885, p. viii.
gemmarius, Ashm. (*Cynips*) l. c. 1885, p. ix.
capsualus, Ashm. (*Cynips*) l. c. 1885, p. ix.
virens, Ashm. (*Cynips*) l. c. 1881, p. x.
succinipes, Ashm. (*Cynips*) l. c. p. xi.
clavigerus, Ashm. (*Cynips*) l. c. p. xxvii.
omnivorus, Ashm. (*Cynips*) l. c. 1885, p. vi.
gibbosus, Prov. Le Nat. Can. vol. xii, p. 232.
quinqueseptum, n. sp.

CYNIPS, Linn.

strobilana, O. S. Proc. Ent. Soc. Phila. ii, p. 254; Bassett, l. c. vi, p. 690.
echinus, O. S. Trans. Am. Ent. Soc. 1870, p. 56.

ACRASPIS, Mayr.

pezomachoides, O. S. (*Teras*) l. c. ii, p. 250.
erinacei, Walsh (*Teras*) l. c. ii, p. 483.

Digitized by Google

BIORHIZA, Westw.

forticornis, Walsh (*Cynips*) l. c. iii, p. 490; (*Teras*) O. S. l. c. iv, p. 379.
hirta, Bass. (*Cynips*) l. c. iii, p. 688; (*Teras*) O. S. l. c. iv, p. 379.
fulvicollis, Fitch (*Philonix*) Rep. No. 291; (*Teras*) O. S. l. c. p. 379.
nigricollis, Fitch (*Philonix*) l. c. No. 292; (*Teras*) O. S. l. c. iv, p. 379.
nigra, Fitch, Fifth Rep. No. 290.

LOXAULIS, Mayr.

globulus, Fitch (*Callaspidia*) Fifth Rep. No. 313; (*Cynips*) O. S. l. c. ante vol. i p. 67; Bassett, l. c. vol. ii, p. 328.
centricola, O. S. (*Cynips*) l. c. vol. i, p. 58.
tenuicornis, Bass. (*Cynips*) Can. Ent. vol. xiii, p. 92.
ficula, Bass. (*Cynips*) l. c. xii, p. 75.
ficigera, Ashm. (*Cynips*) Proc. Ent. Soc. 1885, p. vi.

DRYOPHANTA, Förster.

gemmula, Bass. (*Cynips*) Can. Ent. vol. xiii, p. 104.
nubila, Bass. (*Cynips*) l. c. p. 56.
bella, Bass. (*Cynips*), l. c. p. 56.
polita, Bass. (*Cynips*) l. c. p. 56.
aquaticæ, Ashm. (*Cynips*) Proc. Ent. Soc. 1881, p. xvi.
laurifoliæ, Ashm. (*Cynips*) l. c. p. xvii.

NEUROTERUS, Hartig.

batata, Bass. (*Cynips*) Proc. Ent. Soc. Phila. iii, p. 684; Fitch Fifth Rep. No. 311.
noxiosus, Bass. (*Cynips*) Can. Ent. xiii, p. 108.
vesiculus, Bass. (*Cynips*) Proc. Ent. Soc. Phila. iii, p. 683.
irregularis, O. S. (*Cynips*) l. c. i, p. 65.
verrucarum, O. S. (*Cynips*) l. c. p. 62.
minutus, Bass. (*Cynips*) Can. Ent. vol. xiii, p. 96.
floccosus, Bass. (*Cynips*) l. c. p. 111.
affinis, Bass. (*Cynips*) l. c. p. 103.
piger, Bass. (*Cynips*) l. c. p. 105.
corrugis, Bass. (*Cynips*) l. c. p. 109.
majalis, Bass. (*Cynips*) Proc. Ent. Soc. Phila. iii, p. 683.
Rileyi, Bass. (*Cynips*) Am. Nat. 1881, p. 149; Am. Ent. vol. iii, p. 153 (figure of gall).
crassitelus, Prov. Le Nat. Can. vol. xii, p. 232.
minutissimus, Ashm. (*Cynips*) Proc. Ent. Soc. 1885, p. vii.
confusus, Ashm. (*Cynips*) l. c. 1881, p. xviii.
coniferus, Ashm. (*Cynips*) l. c. p. xxvii.

The following species were characterized from the galls alone and their generic position is uncertain:

Cynips pilulæ, Walsh Proc. Ent. Soc. Phila. vol. iii, p. 481.
Cynips juglans, Osten Sacken l. c. vol. ii, p. 256.
Cynips cicatricula, Bassett Can. Ent. vol. xii, p. 105.

Digitized by Google

Division II.—**INQUILINÆ**, or Guest gall-flies.

PERICLISTIS, Förster.

sylvestris, O. S. (*Aulax*) Proc. Ent. Soc. Phila. vol. iii, p. 37.
pirata, O. S. (*Aulax*) l. c. vol. i, p. 64.
futilis, O. S. (*Aulax*) l. c. vol. i, p. 64.
semipiceus, Harris (*Cynips*) Ins. Inj. Veg. p. 549.

CEROPTRES, Hartig.

flous, Fitch (*Cynips*) Fifth Rep. No. 314.
petiolicola, O. S. (*Amblynotus*) l. c. vol. i, p. 67; vol. v, p. 380.
Amblynotus ensiger Walsh, l. c. vol. ii, p. 496.
inermis, Walsh (*Amblynotus*) l. c. vol. ii, p. 598; (*Ceroptres*) l. c. vol. v, p. 380.
arbos, Fitch (*Cynips*) Fifth Rep. No. 310.
tuber, Fitch (*Cynips*) l. c. No. 309.
obtusilobæ, n. sp.
citriformis, n. sp.
pomiformis, n. sp.
virentis, n. sp.
succinipedis, n. sp.
lanigeræ, n. sp.
minutissimi, n. sp.
Catesbæi, n. sp.

SYNERGUS, Hartig.

lignicola, O. S. Proc. Ent. Soc. vol. ii, p. 252; *rhodtiformis* Walsh l. c. p. 499.
oneratus, Harris (*Cynips*) Ins. Inj. Veg. 3d ed. p. 548; Fitch Second Rep. No. 313; (*Synergus*) Osten Sacken l. c. ante vol. v, p. 380.
læviventris, O. S. (*Synophrus*) l. c. vol. i, p. 54; Walsh vol. ii, p. 494; (*Synergus*) O. S. l. c. vol. v, p. 380.
campanula, O. S. l. c. vol. v, p. 376.
dimorphus, O. S. l. c. vol. v, p. 376.
albipes, Walsh (*Synophrus*) l. c. vol. ii, p. 496.
medax, Walsh l. c. vol. iv, p. 498.
ficigeræ, n. sp.
coniferæ, n. sp.
batatoides, n. sp.
bicolor, n. sp.
medullæ, n. sp.
sapholitus, Förster.
gemmariæ, n. sp.

Division III.—**FIGITINÆ**, or the Parasites.

ALLOTRIA, Westwood.

avenæ, Fitch Sixth Rep. etc. p. 841, N. Y. State Agr. Soc.
tritici, Fitch l. c. p. 841.
lachni, Ashm. n. sp. (Appendix)
? **polita**, Prov. Le Nat. Can. vol. xii, p. 239.*

* This is an *Inquiline*; my specimen is too poor for identification.

Digitized by Google

ANACHARIS, Dalman.

subcompressa, Prov. (*Eucoila*) l. c. (ante) vol. xii, p. 237.

ONYCHIA, Dalman.

quinquelineata, Say (*Diplolepis*) LeConte's Ed. Say's Works vol. ii, p. 716; (*Figites*) Prov. Le Nat. Can. xii, p. 237.

armata, Say (*Diplolepis*) l. c. ii, p. 716; (*Figites*) Prov. l. c. xii, 238.

EUCOILA, Westwood.

stigmata. Say (*Figites*) l. c. ii, p. 718.
Kleidotoma maculipennis, Prov. l. c. xii, 237.

impatiens, Say (*Diplolepis*) l. c. ii, p. 716.
Kleidotoma cupulifera Prov. l. c. xii, 238.

pedata, Say (*Diplolepis*) l. c. ii, p. 717.

mellipes, Say (*Figites*) l. c. ii, p. 718.
Kleidotoma minima Prov. l. c. xii, p. 238.

KLEIDOTOMA, Westwood.

vagabunda, n. sp.

FIGITES, Latreille.

impatiens, Say l. c. ii, p. 718.

? chinquapin, Fitch Fifth Rep. No. 320.

ÆGILIPS, Halliday.

? aciculatus, Prov. l. c. (ante) vol. xii, p. 239.

? obtusilobæ, O. S. Proc. Ent. Soc. Phila. vol. i, p. 68.

IBALIA, Latreille.

ensiger, Norton l. c. vol. i, p. 200.

anceps, Say LeConte's Ed. Say's Works vol. i, p. 218.

maculipennis, Hald. Proc. Acad. Nat. Sci. vol. iii, p. 127.

rufipes, Cress. Proc. Ent. Sec. A. N. S. 1879, p. xvii.

montana, Cress. l. c. 1879, p. xvii.

The following species, recorded by Dr. Harris in his "Catalogue of Insects of Massachusetts," Amherst, 1835, are unknown to me and should probably be dropped; as I am informed, through the courtesy of Mr. Samuel Henshaw, Curator of Boston Society of Natural History, that they are but MS. names of Dr. Harris:

Diplolepes.	Figites.
flagellatus.	pini.
impolita.	melisoma.
devius.	
potentillæ.	

Summary.

Psenidæ	121 species.
Inquilinæ	30 "
Figitinæ	21 "
Total	172

Digitized by Google

Descriptions of New Species.

AMPHIBOLIPS Reinh.

A. melanocera Ashm.

Galls.—Greenish brown and yellowish green round, globular galls, issuing from bud axils of *Quercus aquatica;* they vary greatly in size from one-quarter to half an inch in diameter. The outer shell is very thin, and interiorly there is a central kernel held in place by some very thin hair-like filaments.

Gall-fly.—♂. Length .18-.20 inch. Head, antennæ and thorax black or brown-black, sparsely pubescent; head and thorax coarsely rugoso-punctate; antennæ 14-jointed, rather long; pleuræ coarsely rugose; scutellum rugose, bifoveolate; coxæ black, anterior and intermediate legs brown, tibiæ darker, feet paler; posterior legs black or brown-black; abdomen shining, red-brown; wings hyaline, veins dark, and a large brown blotch at base of radius with a pale centre.

This species resembles *Amphibolips citriformis* Ashm., but is easily distinguished by its dark antennæ and by the black posterior legs. The gall, too, is markedly different in shape, although constructed on the same plan as in that species.

Described from eight specimens bred in June.

ANDRICUS Hartig.

A. quercifoliæ Ashm.

Galls.—Succulent, round gall on the leaves of *Quercus Catesbæi*, with a loose, whitish kernel; constructed in the same manner as *Dryophanta aquaticæ*, but much smaller in size.

Gall-fly.—♂. Length .07 inch. Black, shining; sparsely pubescent and microscopically scratched; antennæ 14-jointed, honey yellow at base, brownish towards tip; thorax smooth, parapsides distinct; scutellum rugose, pubescent; abdomen polished black, slightly compressed; legs honey yellow; wings hyaline, veins brownish.

The above is described from three bred specimens which issued from galls in May. The galls are rare, and the flies difficult to raise.

A. quinqueseptum Ashmead.

Galls.—Hard, globular galls on leaf petiole of *Quercus obtusiloba*, projecting equally above and below; rounded beneath, but above with a prominent projection or nipple. The gall at first is of a beautiful smooth, reddish brown, microscopically pubescent, but turns black with age. In diameter it measures one-quarter of an inch, and interiorly is divided into five longitudinal partitions, the fly living in the centre.

Gall-fly.—♂. Length .12 inch. Head and thorax brown, very finely punctured, sparsely pubescent, the pubescence being denser on the face; antennæ 14-jointed, yellowish, gradually thickening towards tip, third joint as long as one and two combined, following joints sub-equal, terminal joint very small; parap-

Digitized by Google

sides distinct, finely pubescent above, but much heavier pubescent at sides; scutellum coarsely rugoso-punctate, bifoveolate; mesopleuræ almost black, upper portion smooth and shining, lower longitudinally strigose; legs amber colored, hairy, middle and anterior coxæ black at base, posterior almost black, fringed with long hairs behind, a strong tibial spur on forelegs, hind femora blackish along the upper edges, with the tibiæ more or less infuscated; abdomen smooth, reddish brown, shining, segment of venter visible its whole length; wings hyaline, veins pale, tinged with yellow.

Described from twelve specimens bred in July.

CEROPTRES Hartig.

C. obtusilobæ Ashmead.

♂. Length .15 inch. Uniform light reddish brown, pubescent; head finely punctate; thorax rather coarsely rugoso-punctate; antennæ 13-jointed; the abdomen is compressed, and the ovipositor projects considerably; posterior tibiæ and first tarsal joint dark brown; wings hyaline, with veins brown and somewhat thickened.

Described from two ♀ specimens bred from an unnamed gall on *Quercus obtusiloba*.

C. citriformis Ashmead.

Length .04–.08 inch. Color: shining brown-black; antennæ 15-jointed in ♂, 14-jointed in ♀, and of a light brown color; parapsides distinct; abdomen dark reddish brown, polished; legs uniform light yellowish; wings hyaline.

Described from numerous specimens bred in 1881 from gall *Amphibolips citriformis* Ashm. I notice this guest fly makes a pseudo-gall on the rind.

C. pomiformis Ashmead.

♂. Length .05 inch. Slender; head yellowish brown, with a dark brown blotch enclosing ocelli; eyes brown; antennæ 15-jointed, yellowish, with the apical third brown; thorax black, finely pubescent; abdomen bright yellowish brown, infuscated towards tip; wings hyaline, veins yellow, radial area closed, narrow.

This pretty little species is described from two specimens bred from gall *Andricus pomiformis* Bass., sent to me from California.

C. virentis Ashmead.

♀. Length .08 inch. Uniform yellowish brown; head and thorax finely punctured; eyes dark brown; antennæ 14-jointed, brownish towards tip; wings hyaline, veins pale yellowish.

Described from specimens bred in 1881 from gall *Andricus virens* Ashm.

C. succinipedis Ashmead.

Length .05–07 inch. Brown-black, pubescent; antennæ 14-jointed in ♀, pale yellowish; abdomen shining black, more or less rufous at base and surrounding anus; wings hyaline, veins pale.

Described from specimens bred 1881 from gall *Andricus succinipes* Ashm.

Digitized by Google

C. lanigerae Ashmead.

Length .08–.10 inch. Red-brown, punctate; eyes dark brown; antennæ 13-jointed, yellowish; mesoscutum infuscated along the anterior edge; abdomen darker along the sides; legs light reddish brown, with feet paler, and the posterior femora and tibiæ brown; wings hyaline, veins pale.

Described from specimens bred from gall *Andricus lanigera* Ashm. in 1881.

C. minutissimi Ashmead.

Length .04–.06 inch. Head and thorax dark brown or shining black, rugoso-punctate; antennæ long, 15-jointed in ♂, 13-jointed in ♀; yellowish, with slight reddish tinge, the apical joint is thickened and twice as long as the penultimate; legs honey yellow; abdomen black, shining; wings hyaline, veins yellow; the valve of the ovipositor is long and projects considerably above the upper surface of the abdomen.

Described from many specimens bred from gall *Neuroterus minutissimus* Ashm.

C. Catesbaei Ashmead.

Length .06–.08 inch. Black, shining, and resembles *minutissimi* very much, but, however, is readily distinguished from it by its much paler yellow colored antennæ and legs, coarser sculpture of the thorax and scutellum, and by the abdomen, which is testaceous at base and along the venter beneath.

Described from many specimens bred from gall *Andricus Catesbaei* Ashm.

SYNERGUS Hartig.

S. ficigerae Ashmead.

Length .08–.14 inch. Head and thorax reddish brown, punctate, the punctures coarser on thorax, slightly pubescent; antennæ 13-jointed in ♀, 15-jointed in ♂, yellowish; abdomen yellow, testaceous, with a large black blotch on disc; legs yellowish, posterior tibiæ brown along the upper edge; wings hyaline, veins brown.

This species approaches nearest to *S. lignicola* O. S., but is easily distinguished from it by its smaller size and brownish head and thorax.

Described from seven specimens bred from gall *Holcaspis ficigera* Ashm. in 1881.

S. coniferae Ashmead.

Length .10 inch. Reddish brown, punctate and finely pubescent, the pubescence being quite thick on the face; antennæ 14-jointed, reaching to base of abdomen; thorax transversely wrinkled with parapsides distinct; abdomen at base testaceous; posterior femora and intermediate and posterior tibiæ along upper edges brown; wings hyaline, veins pale.

Described from numerous specimens bred from gall *Cynips conifera* Ashm.

S. batatoides Ashm.

Length .12–.14 inch. Head, antennæ and legs yellowish; head punctate with a brown blotch on vertex; antennæ short, 14-jointed in ♀, 15-jointed in ♂,

Digitized by Google

thorax and abdomen black, the latter polished, the thorax is coarsely punctate and finely pubescent; wings hyaline, veins brown.

Described from numerous specimens bred from gall *Andricus batatoides* Ashm. in 1881.

S. bicolor Ashmead.

Length .12–.14 inch. Head, thorax, antennæ and legs yellowish; thorax and head finely rugoso-punctatate; a small brown blotch on vertex of head and a medial stripe on mesoscutum and along the hinder edges; antennæ 15-jointed in ♂, 13-jointed in ♀; abdomen polished black; wings hyaline, veins yellowish.

One ♀ is without the longitudinal medial stripe.

Described from several specimens bred from gall *Andricus foliatus* Ashm.

S. medullæ Ashmead.

Length .07–.16 inch, it varying greatly in size. Head and thorax coarsely rugoso-punctate; antennæ 15-jointed in ♀, 15-jointed in ♂, they with head and sides of collar yellowish; eyes and thorax brown; abdomen black, smooth and shining; wings hyaline, veins yellow.

Described from numerous specimens bred from gall *Andricus medullæ* Ashm.

Although this species varies greatly in size, there is a remarkable similarity in coloration.

SAPHOLYTUS Förster.

S. gemmariæ Ashmead.

♂. Length .08 inch. Black, shining; head finely punctate, pubescent; antennæ 15-jointed, light brown, becoming darker towards tip; thorax with parapsides distinct and finely microscopically scratched; scutellum rugoso-punctate; abdomen black, polished; legs dark brown, excepting anterior tibiæ and tarsi which are lighter or reddish; wings hyaline, veins yellowish and the radial area is open.

Described from one ♂ specimen bred from gall *Andricus gemmaria* Ashm.

ALLOTRIA Westw.

A. lachni Ashmead.

Length .06–.10 inch. Black and lightly polished, with antennæ 15-jointed in ♂, 14-jointed in ♀; legs and antennæ yellow testaceous, with the tip of antennæ and posterior femora infuscated; the scutellum is rounded, smooth and convex, but with two small foveæ at base; wings hyaline.

KLEIDOTOMA Westw.

K. vagabunda Ashmead.

Length .17 inch. Slender, highly polished and of a dark wine red; antennæ 13-jointed, highly polished, very slightly pubescent and gradually thickening towards tip, joints three to seven sub-equal, following joints more or less moniliform, terminal joint fusiform, and one-third longer than the penultimate; thorax smooth, high, slightly compressed at sides; scutellum deeply excavated at base with two projections at sides, and an elevated tupuliferous disc; abdomen com-

Digitized by Google

pressed and obliquely truncate at tip, at base there is a longitudinally strigose rim; wings hyaline, with veins of a decided yellowish cast.

This beautiful species is described from a single specimen which lodged on my shoulder as I passed through a swamp, and is easily recognized from all others of this genus.

The Trees and Plants on which the North American CYNIPIDÆ are found, with a List of the Described Species found thereon.

THE OAKS (*Cupuliferæ*).

ENCENO OAK. (*Quercus agrifolia*)

Andricus pomiformis, *B.*
Callirhytis agrifoliæ, *B.*
Cynips echinus, *O. S.*

WHITE OAK. (*Quercus alba*)

Acraspis pezomachoides, *O. S.*
" forticornis, *W.*
Andricus fusiformis, *O. S.*
" lana, *F.*
" utriculus, *B.*
" flocci, *W.*
Callirhytis clavula, *B.*
" tuber, *F.*
" futilis, *O. S.*
" seminator, *H.*
Cynips juglans, *O. S.*
" cicatricula, *B.*
" pisum, *F.*
Holcaspis globulus, *F.*
Loxaulis mammula, *B.*
Neuroterus batatus, *B.*
" majalis, *B.*
" minutus, *B.*
" vesiculus, *B.*

WATER OAK. (*Quercus aquatica*)

Dryophanta aquaticæ, *A.*
Andricus Turnerii, *A.*
Amphibolips melanocera, *A.*

SWAMP WHITE OAK. (*Quercus bicolor*)

Andricus ignotus *B.*
Callirhytis capsulus, *B.*
Cynips strobilana, *O. S.*
Neuroterus noxiosus, *B.*
" floccosus, *B.*

BLACK JACK, or SCRUB OAK. (*Quercus Catesbaei*)

Andricus Catesbaei, *A.*
" omnivorus, *A.*
" capsualus, *A.*

UPLAND WILLOW, or BLUE JACK OAK. (*Quercus cinerea*)

Amphibolips cinerea, *A.*
Andricus omnivorus, *A.*
" medullæ, *A.*
" gemmarius, *A.*
" capsualus, *A.*

SCARLET OAK. (*Quercus coccinea*)

Amphibolips coccineæ, *O. S.*
" nanus, *O. S.*
Andricus Osten Sackenii, *B.*

LAUREL OAK. (*Quercus laurifolia*)

Amphibolips racemaria, *A.*
" citriformis, *A.*
Andricus rugosus, *A.*
" clavigerus, *A.*
Holcaspis fuliginosa, *A.*
Neuroterus confusus, *A.*
" coniferus, *A.*

BURR OAK, OVERCUP OAK. (*Quercus ficula*)

Holcaspis ficula, *B.*

Digitized by Google

BLACK JACK OAK, BARREN OAK.
(*Quercus nigra*)

Callirhytis nigræ, *O. S.*
" operator, *O. S.*
" podagræ, *W.*

PIN OAK, SWAMP SPANISH OAK.
(*Quercus palustris*)

Callirhytis cornigera, *O. S.*
" palustris, *O. S.*
" notha, *O. S.*

WILLOW OAK.
(*Quercus phellos*)

Amphibolips phellos, *O. S.*

CHESTNUT OAK.
(*Quercus castanea*)

Neuroterus Rileyi, *B.*

HINDS' OAK.
(*Quercus Hindsii*)

Andricus californicus, *B.*

MOUNTAIN CHESTNUT OAK.
(*Quercus montana*)

Andricus petiolicola, *B.*
Biorhiza, fulvicollis, *F.*

OAK.
(*Quercus prinoides?*)

Dryophanta gemmula, *B.*
Holcaspis rugosa, *B.*
Neuroterus affinis, *B.*
" corrugis, *B.*

RED OAK.
(*Quercus rubra*)

Amphibolips nubilipennis, *H.*
" cœlebs, *O. S.*
" formosa, *B.*
" sculpta, *B.*
Andricus, singularis, *B.*
" confluens, *B.*
" papulus, *B.*
Callirhytis modesta, *O. S.*
" punctata, *B.*
Cynips pilulæ, *W.*

POST OAK.
(*Quercus obtusiloba*)

Andricus tubicola, *O. S.*
" Pattoni, *B.*
" omnivorus, *A.*
Dryophanta polita, *B.*
Holcaspis, centricola, *O. S.*
Neuroterus verrucarum, *O. S.*
" irregularis, *O. S.*

BLACK OAK, YELLOW BARKED OAK.
(*Quercus tinctoria*)

Amphibolips spongifica, *O. S.*
Andricus, papulus, *B.*
Callirhytis, tumifica, *O. S.*
" podagræ, *W.*
" scitula, *B.*
Neuroterus piger, *B.*

OAK.
(*Quercus ilicifolia*)

Amphibolips ilicifolia, *B.*
Andricus Osten Sackenii, *B.*
" ventricosus, *B.*
Callirhytis similis, *B.*

ON UNKNOWN OAKS.

Andricus cinerosus, *B.*
" Coxii, *B.*
Callirhytis Suttonii, *B.*
Dryophanta nubila, *B.*
" bella, *B.*
Holcaspis tenuicornis, *B.*

POTATO.
(*Solanum tuberosum*)

Tribalia batatorum, *W.*

THE ROSE.
(*Rosa carolina, etc.*)

Rhodites dichlocerus, *H.*
" bicolor, *H.*
" ignota, *O. S.*
" rosæ, *L.*
" radicum, *O. S.*
" verna, *O. S.*

CINQUEFOIL.
(*Potentilla canadensis*)

Diastrophus radicum, *B.*
" turdigus, *B.*
" nebulosus, *O. S.*
" cuscutæformis, *O. S.*

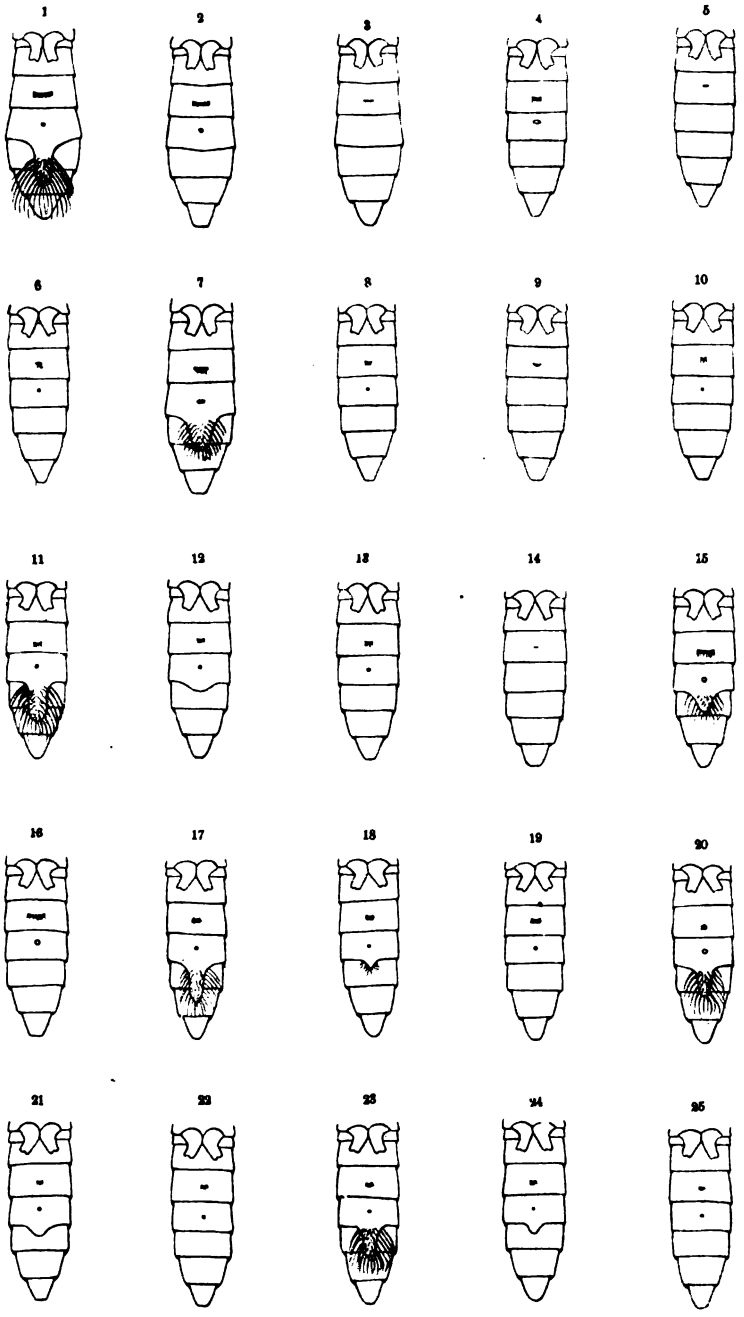
CATNIP.
(*Nepeta glechoma*)

Diastrophus similis, *B.*

COMMON PLANT.
(*Lygodesmia juncea*)

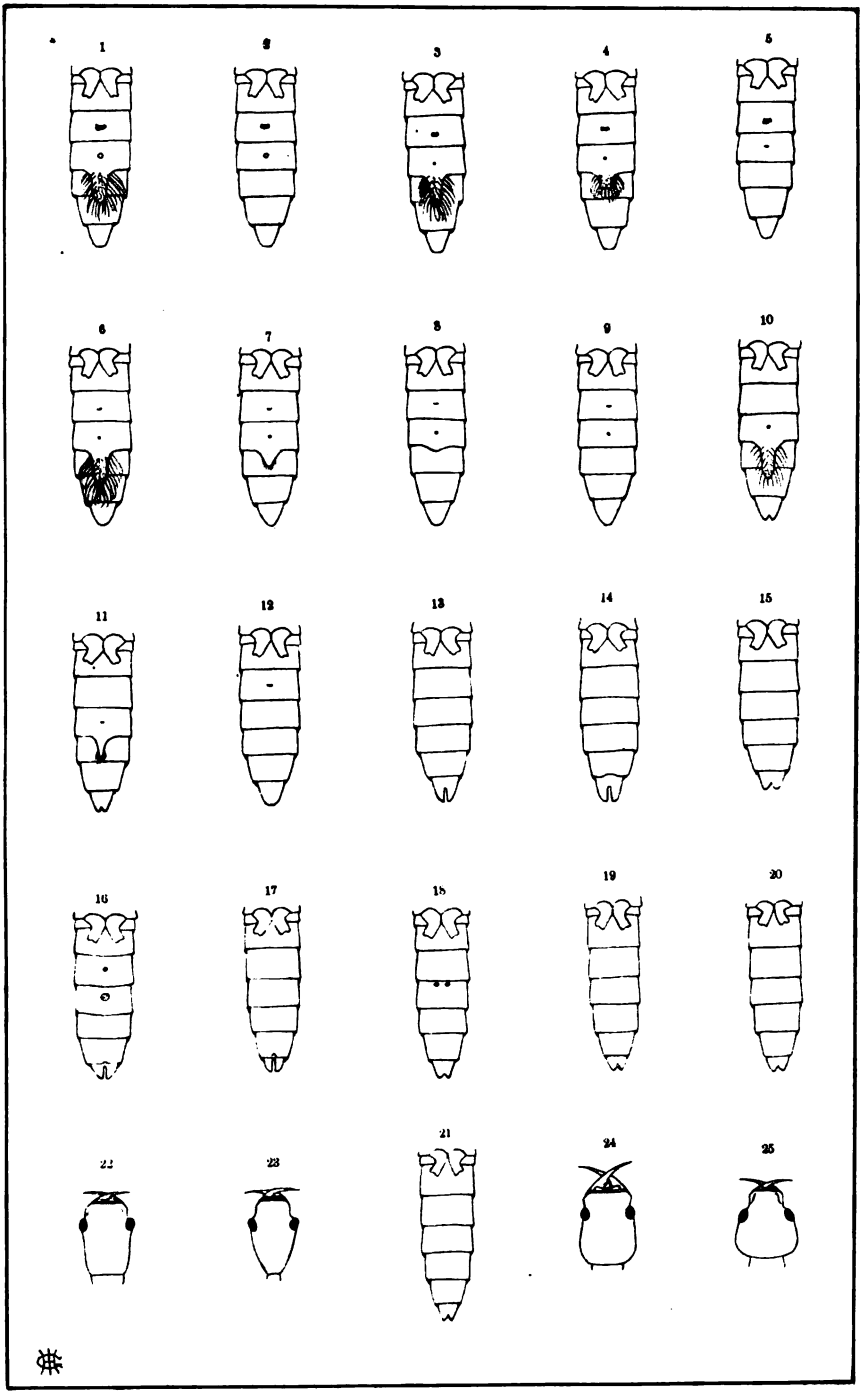
Antistrophus pisum, *W.*

Digitized by Google



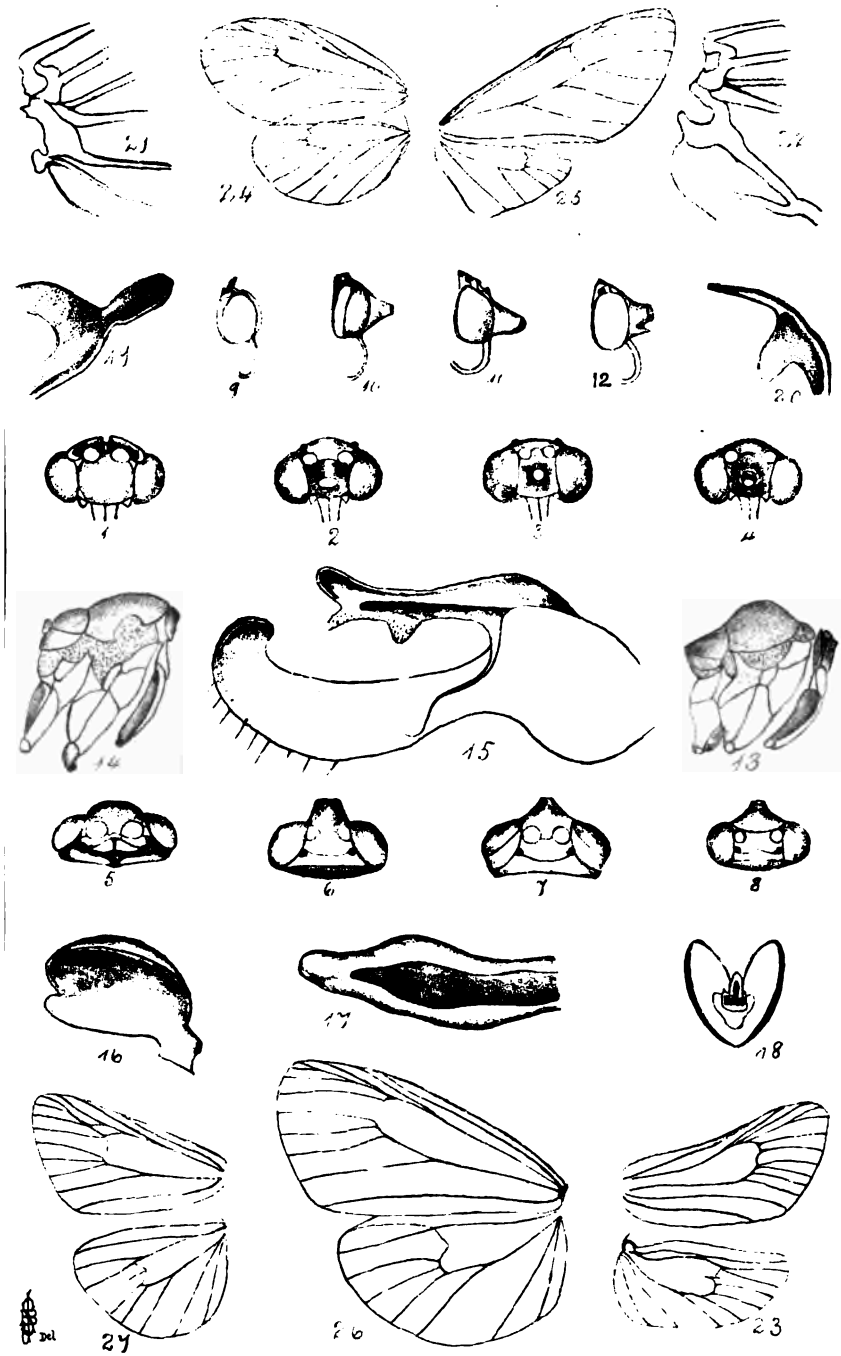
Digitized by Google

Digitized by Google



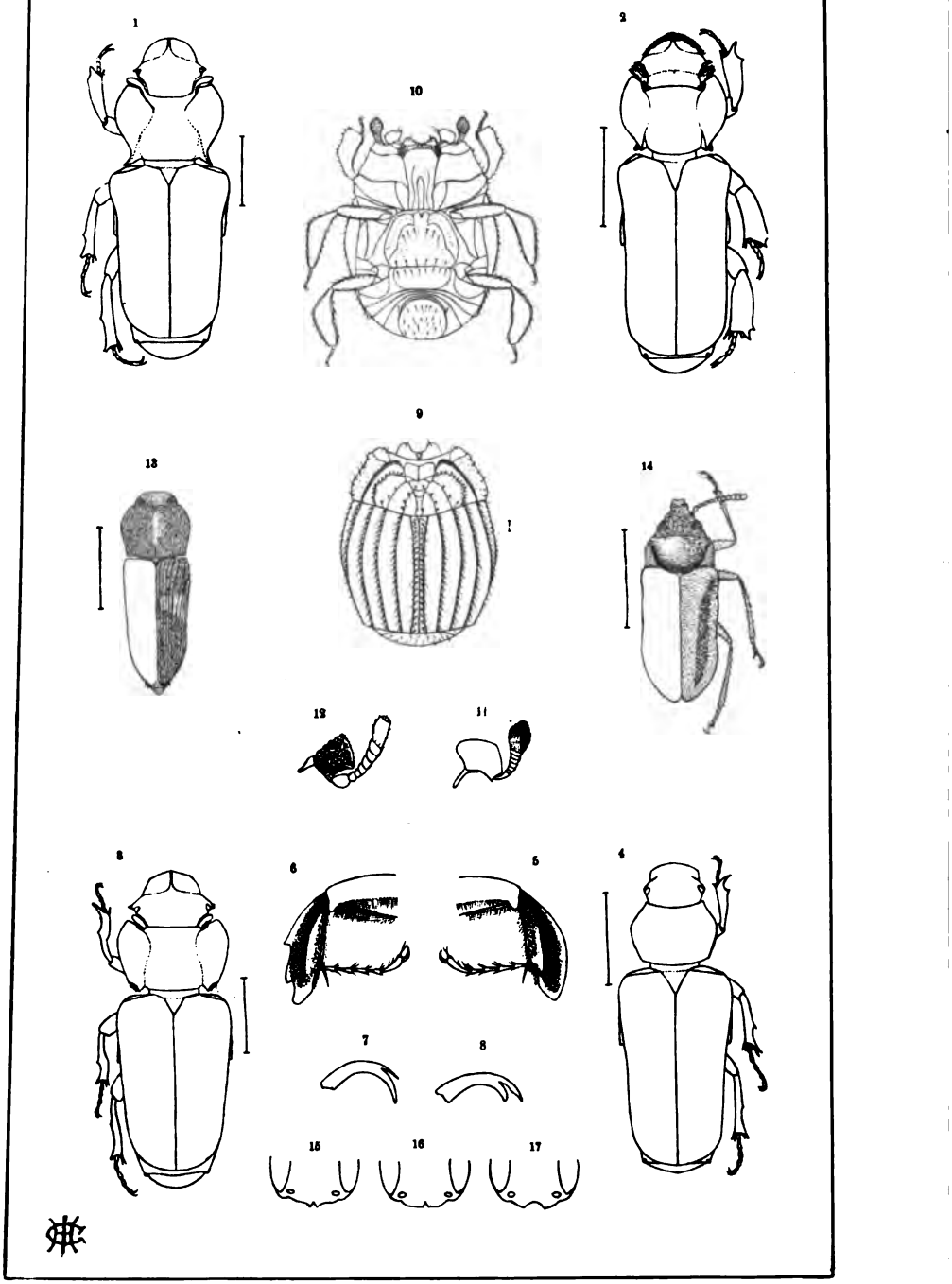
Digitized by Google

Digitized by Google



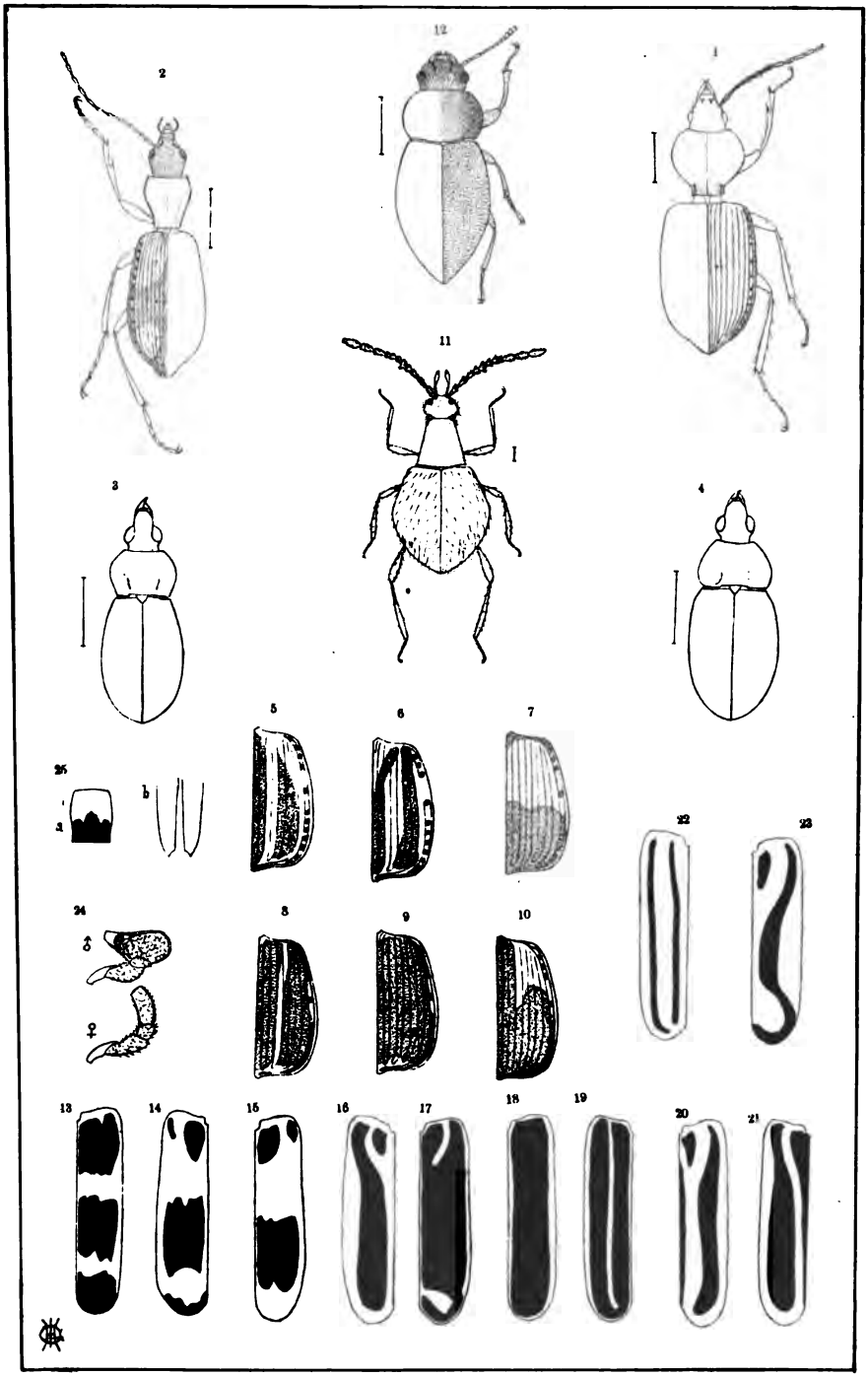
Digitized by Google

Digitized by Google



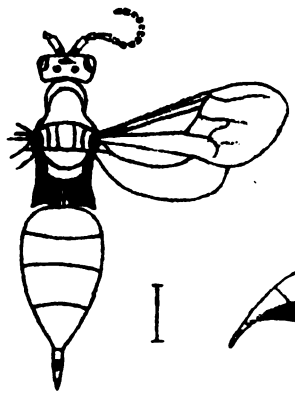
Digitized by Google

Digitized by Google



Digitized by Google

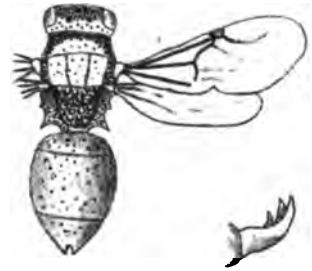
Digitized by Google


1

2

3

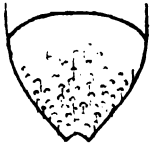
4


5

6

7

8


9

10

11

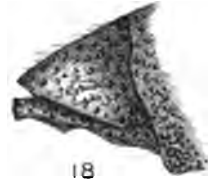
12

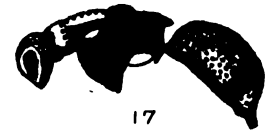
13

14

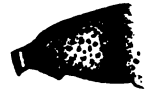
15

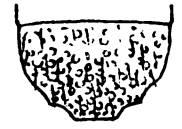
16


18


17

19


20


21

Digitized by Google

Digitized by Google

24

23

22

30

25

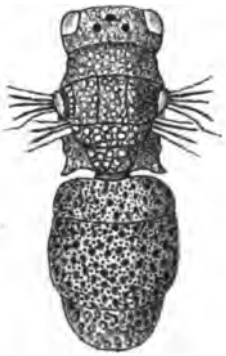
26

31

34

27

32



35

28

33

29

S.F.A.

Digitized by Google

Digitized by Google

36

38

39

37

40

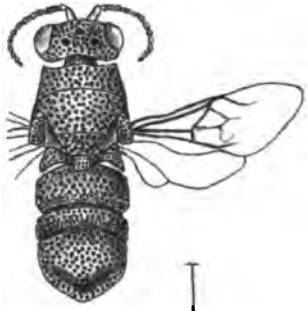
41

42

43

44

45



49

48

46

47

S.F.A.

Digitized by Google

Digitized by Google

53

52

51

50

56

57

55

54

58

59

60

61

62

63

64

65

66

67

68

69

S.F.A.

Digitized by Google

Digitized by Google

70

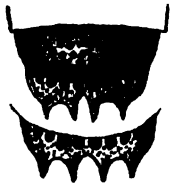
71

72

73

74

75


76

77

78

79

80

81

82

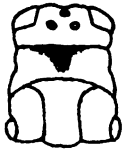
83

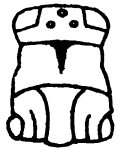
84

85

86

87


88


89

S.F.A.

Digitized by Google

Digitized by Google

3599
May 26. 1885

VOLUME XII, NUMBER 1.

TRANSACTIONS

OF THE

AMERICAN

ENTOMOLOGICAL SOCIETY

AND PROCEEDINGS OF THE

ENTOMOLOGICAL SECTION

OF THE

ACADEMY OF NATURAL SCIENCES.

PHILADELPHIA:
GEORGE B. CRESSON, ENTOMOLOGICAL PRINTER,
No. 55 North Seventh Street.
1885.

Digitized by Google

Digitized by Google

PRICE LIST

OF

ENTOMOLOGICAL PUBLICATIONS

FOR SALE.

COLEOPTERA.

1.—**Blanchard,** (Frederick)—On the species of Canthon and Phanæus of the United States with notes on other genera. 10 pp. (Trans. Am. Ent. Soc. 1885) ..... .15

2.—**Bland,** (J. H. B.)—Descriptions of new N. Am. Coleoptera. 4 pp. (Proc. Ent. Soc. 1864)..... .10

3.—Descriptions of several new species of N. Am. Coleoptera. 4 pp. (Proc. Ent. Soc. 1865)..... .10

4.—Descriptions of a few supposed new species of N. Am. Coleoptera. 4 pp. (Proc. Ent. Soc. 1863)..... .10

5.—**Casey,** (T. L.)—Revision of the Cucujidae of America north of Mex. 42 pp. 5 plates (Trans. Am. Ent. Soc. 1884)..... .60

6.—**Chenu.**—Encyclopedie D'Hist. Naturelle Coléoptères. Woodcuts. (Half roan and boards, good condition)..... 2.00

7.—**Crotch,** (G. D.)—Materials for the study of the Phytophaga of the U. S. Notes on the species of Buprestidæ found in the U. S. 77 pp. (Proc. Acad. Nat. Sci. 1873)..... .50

8.—Synopsis of the Erotylidæ of Boreal America. Synopsis of the Endomychidæ of the U. S. Revision of the Coccinellidæ of the U. S. Revision of the Dytiscidæ of the U. S. 76 pp. (Trans. Am. Ent. Soc. 1873) ..... .50

9.—Descriptions of new species of Coleoptera from the Pacific Coast of the U. S. 8 pp. (Trans. Am. Ent. Soc. 1874)..... .10

10.—**De Jean.**—Catalogue des Coléoptères. 1 vol. 1837, (morocco and boards; interleaved; a little worn)..... 1.00

11.—**DuVal,** (Jacuelin)—Genera Coléoptères D'Europe. Vol. 1 in parts, paper covers; 1854. 29 colored plates of Curculionidæ..... 2.00

12.—**Ehlers,** (W.)—Description of new blind Bembidii. 1 p. (Trans. Am. Ent. Soc. 1883)..... .05

13.—**Haldeman,** (S. S.)—Cryptocephalus Boreali-Amer. speceibus novis musei lecontiani. (Jour. Acad. Nat. Sci. Phil. 1849.) Paper, good condition, with Society's stamp on first page)..... .50

14.—**Henshaw,** (Samuel)—Index to Coleoptera described by J. L. LeConte, M.D. 76 pp. (Trans. Am. Ent. Soc. 1881-82)..... .50

15.—List of the Coleoptera of North America. (In press; will issue abuot September 1, 1885. See advertisement at end of this list)..... 1.25

16.— Idem. Interleaved for additions..... 1.50

17.—**Horn,** (G. H.)—Notes on the Habits of some Coleopterous Larvæ and Pupæ. 3 pp. (Proc. Ent. Soc. 1861)..... .06

Digitized by Google

18.—Observations on the Habits of some Coleopterous Larvæ and Pupæ. 2 pp. (Proc. Ent. Soc. 1861) ..... .05

19.—Descriptions of some new North American Coleoptera. 2 pp. (Proc. Ent. Soc. 1862) ..... .05

20.—Notes on the Habits of a few California Coleoptera. On Usechus lacerta, Motsch. On Rhagodera tuberculata, Mann. Some observations on Phodaga alticeps, Lec. 8 pp. (Proc. Ent. Soc. 1867) ..... .15

21.—Catalogue of Coleoptera from southwestern Virgina. 6 pp. (Trans. Am. Ent. Soc. 1868) ..... .10

22.—New species of Coleoptera from the Pacific District of the U. S. 12 pp. (Trans. Am. Ent. Soc. 1868) ..... .15

23.—Synopsis of the Parnidæ of the U. S. Notes on some genera of Coprophagous Scarabæidæ of the U. S. 22 pp. (Trans. Am. Ent. Soc. 1870) ..... .20

24.—Contributions to the Coleopterology of the U. S. Descriptive Catalogue of Nebria and Pelophila of the U. S. On the species of Oodes and allied genera. Descriptions of the species of Aphodius of the U. S. Descriptions of new Histeridæ of the U. S. 74 pp. 1 pl. (Trans. Am. Ent. Soc. 1870) ..... .65

25.—Synopsis of the Malachiidæ of the U. S. The Brenthidæ of the U. S. Revision of the species of Lebia of the U. S. Descriptions of some new N. Am. Coleoptera. 44 pp. cuts. (Trans. Am. Ent. Soc. 1872)... .35

26.—Revision of the species of Trox of the U. S. 12 pp. (Trans. Am. Ent. Soc. 1874) ..... .10

27.—Descriptions of new species of U. S. Coleoptera. 24 pp. (Trans. Am. Ent. Soc. 1874) ..... .15

28.—Notes on the species of Rhipiphorus of the U. S. Synonymical notes and descriptions of new species of N. Am. Coleoptera. 36 pp. (Trans. Am. Ent. Soc. 1875) ..... .25

29.—Revision of the U. S. species of Ochodæus and other genera of Scarabæidæ. 25 pp. (Trans. Am. Ent. Soc. 1876) ..... .20

30.—Description of a new species of Dacoderus from the Island of Santo Domingo. Synopsis of the species of Cymatodera and Trichodes of the U. S. The sexual characters of N. Am. Cicindelidæ with notes on some groups of Cicindela. Notes on some Coleopterous remains from the bone cave of Port Kennedy, Pa. Synoptic tables of some genera of Coleoptera with Notes and Synonymy. Revision of the species of Chlænius of the U. S. 58 pp. 1 pl. (Trans. Am. Ent. Soc. 1876) ..... .60

31.—Synopsis of the genera and species of the Staphylinidæ Tribe Tachyporini of the U. S. 48 pp. 1 pl. (Trans. Am. Ent. Soc. 1877) ..... .50

32.—Notes on some species of Hister. Revision of the species of Acmæodera of the U. S. Descriptions of the larvæ of the N. Am. genera of Cicindelidæ, also of Dicælus, with a note on Rhynchophorus. Notes on some genera of Cerambycidæ of the U. S. Contributions to the Coleopterology of the U. S. No. 2. 60 pp. 2 plates (Trans. Am. Ent. Soc. 1878) ..... .60

33.—Revision of the species of Listrochelus of the U. S. Synopsis of the Quediini of the U. S. Synopsis of the species of Cychrus inhabiting Boreal America. Synopsis of the species of Staphylinus and the

Digitized by Google

more closely allied genera inhabiting the U. S. 64 pp. (Trans. Am. Ent. Soc. 1878) ..... .50

34.—Synopsis of the Monotomidæ of the U. S. Revision of the Nitidulidæ of the U. S. Notes on the Mycteridæ and other Heteromera. 84 pp. pl. (Trans. Am. Ent. Soc. 1879) ..... .65

35.—Revision of the species of the sub-family Bostrichidæ of the U. S. Synopsis of the Colydiidæ of the U. S. (Proc. Am. Phil. Soc. 1878) 53 pages ..... .40

36.—Monographic revision of the species of Cremastochilus of the U. S. Synopsis of the Euphoriæ of the U. S. (Proc. Am. Phil. Soc. 1879) 27 pp. 1 plate ..... .30

37.—Review of the species of Anisodactylus inhabiting the U. S. Critical notes on the species of Selenophorus of the U. S. (Proc. Am. Phil. Soc. 1880) 22 pp ..... .20

38.—Notes on the species of Asaphes of Boreal America. Synopsis of the Dascyllidæ of the U. S. Notes on some genera of Cerambycidæ with descriptions of new species. Contributions to the Coleopterology of the U. S. No. 3. 84 pp. 3 plates (Trans. Am. Ent. Soc. 1880) ..... .75

39.—Synopsis of the Silphidæ of the U. S. with reference to the genera of other countries. 104 pp. 3 plates (Trans. Am. Ent. Soc. 1880) 1.00

40.—Revision of the species of Polyphylla of the U. S. Notes on Elateridæ, Cebrionidæ, Rhipiceridæ and Dascyllidæ. 18 pp. 2 plates (Trans. Am. Ent. Soc. 1881) ..... .25

41.—On the genera of Carabidæ, with special reference to the fauna of Boreal America. 106 pp. 8 plates (Trans. Am. Ent. Soc. 1881) 1.25

42.—Revision of the species of some genera of Buprestidæ. Notes on some little known genera and species of Coleoptera. Synopsis of the species of the tribe Lebiini. 64 pp. 3 plates (Trans. Am. Ent. Soc. 1882) ..... .75

43.—Miscellaneous Notes and Short Studies of North American Coleoptera. 44 pp. 1 pl. (Trans. Am. Ent. Soc. 1883) ..... .35

44.—Synopsis of the Philonthi of Boreal America. 68 pp. (Trans. Am. Ent. Soc. 1884) ..... .50

45.—Notes on the species of Anomala inhabiting the U. S. Synopsis of the U. S. species of Notoxus and Mecynotarsus. 20 pp. (Trans. Am. Ent. Soc. 1884) ..... .15

46.—A study of some genera of Elateridæ. 20 pp. (Trans. Am. Ent. Soc. 1884) ..... .15

47.—A study of the species of Cryptobium of N. A. 22 pp. 2 plates (Trans. Am. Ent. Soc. 1885) ..... .25

48.—Studies among the Meloidæ. Descriptions of new N. Am. Scarabæidæ. Contributions to the Coleopterology of the U. S. No. 4. 56 pp. 2 plates (Trans. Am. Ent. Soc. 1885 ..... .65

49.—Descriptions of some new Cerambycidæ with notes. 25 pp. (Trans. Am. Ent. Soc. 1885) ..... .20

50.—Synopsis of the Throscidæ of the U. S. 11 pp. (Trans. Am. Ent. Soc. 1885) ..... .10

51.—**Jayne,** (H. F.)—Descriptions of some monstrosities observed in N. Am. Coleoptera. 8 pp. 1 pl. (Trans. Am. Ent. Soc. 1880) ..... .15

52.—**Lacordaire,**—Hist. Nat. des Ins. des Coléoptères. Atlas. 60 finely colored plates with explanations, with Society's stamp on each, not bound, and wanting the following 20 plates 1.50

Digitized by Google

53.—**LeConte,** (J. L.)—The Coleoptera of Kansas and Eastern New Mex. 58 pp. 3 plates, 4to, 1859 ..... .75

54.—Remarks on the sub-family Clavigeridæ. 1 p. (Proc. Acad. Nat. Sci. 1866) ..... .05

55.—List of the Coleoptera of N. Am. Part 1. 82 pp. 1866 ..... .50

56.—Synopsis of the Scolytidæ of America north of Mexico, from the MSS. of the late Dr. C. Zimmermann. 38 pp. (Trans. Am. Ent. Soc. 1868). .25

57.—Coleoptera of the U. S. Coast Survey Expedition to Alaska under charge of Mr. George Davidson. 6 pp. (Trans. Am. Ent. Soc. 1868) ..... .10

58.—Analytical table of the species of Baridius inhabiting the U. S. The Gyrinidæ of America north of Mexico. Notes on the species of Agonoderus, Bradycellus and Stenolophus inhabiting America north of Mexico. 22 pp. (Proc. Acad. Nat. Sci. 1868) ..... .15

59.—Synonymical notes on Coleoptera of the U. S. with descriptions of new species, from the MSS. of the late Dr. C. Zimmermann. 17 pp. (Trans. Am. Ent. Soc. 1869) ..... .15

60.—On the Platypsyllidæ, a new family of Coleoptera. 6 pp. 1 pl. (Proc. Zool. Soc. Lond. 1872) ..... .15

61.—New species of N. Am. Coleoptera. Part 1. 180 pp. 1866 ..... 1.00

62.— Idem. Part 2, 71 pp. 1873 ..... .50

63.—Catalogue of the Coleoptera of Mt. Washington, N. H., with descriptions of new species. 12 pp. (Proc. Bost. Soc. 1874) ..... .10

64.—Descriptions of new Coleoptera chiefly from the Pacific slope of N. A. Note on the genus Pleocoma. Description of the larva of Pleocoma. On the Cupesidæ of N. A. 44 pp. (Trans. Am. Ent. Soc. 1874) ..... .35

65.—Note on the genus Pleocoma and description of the larva (by Osten Sacken). On the Cupesidæ of N. Am. 8 pp. cuts. (Trans. Am. Ent. Soc. 1874) ..... .10

66.—Notes on the species of Pasimachus. 8 pp. (Bull. Buff. Soc. 1874) ..... .10

67.—On the Affinities of Hypocephalus. 10 pp. (Trans. Am. Ent. Soc. 1876). .10

68.—On certain genera of Staphylinidæ, Oxytelini, Piestidæ and Micropeplidæ, as represented in the fauna of the U. S. 40 pp. (Trans. Am. Ent. Soc. 1877) ..... .30

69.—Short studies of N. Am. Coleoptera. 56 pp. (Trans. Am. Soc. 1880) ..... .50

70.—Short studies of N. Am. Coleoptera. No. 2. 32 pp. (Trans. Am. Ent. Soc. 1884) ..... .25

71.—Synopsis of the Lampyridæ of the U. S. 58 pp. (Trans. Am. Ent. Soc. 1881) ..... .50

72.—**Matthews,** (Rev. A.)—Synopsis of N. Am. Trichopterygidæ. 44 pp. (Trans. Am. Ent. Soc. 1884) ..... .25

73.—**Melsheimer,** (F. E.)—Catalogue of the described Coleoptera of the U. S. Revised by Haldeman and LeConte. 174 pp. 1853 ..... .75

74.— Idem. Half morocco and boards, interleaved, nearly new 1.00

75.— Idem. Half morocco and boards, not interleaved, but printed only on one side of the pages 1.00

76.—**Morawitze.**—Beitrag zur Kaffer fauna der Insel Jesso, Cicindelidæ et Carabici. 1863. 84 pp ..... .60

77.—**Osten Sacken,** (R.)—Description of some larvæ of N. Am. Coleoptera. 26 pp. 1 pl. (Proc. Ent. Soc. 1862) ..... .20

Digitized by Google

78.—**Schaum,** (Dr. H.)—Catalogus Coleopterorum Europæ. 1859. Paper. (Society's stamp on title page) ..... .50

79.—**Smith,** (J. B.)—Synopsis of the Mordellidæ of the U. S. 28 pp. 3 plates (Trans. Am. Ent. Soc. 1882)..... .35

80.—Synopsis of the Apioninæ of N. Am. 28 pp. 1 pl. (Trans. Am. Ent. Soc. 1884)..... .25

HYMENOPTERA.

81.—**Blake,** (C. A.)—Descriptions of two new species of Mutilla from Mexico. 1 p. (Trans. Am. Ent. Soc. 1870)..... .05

82.—Synopsis of the Mutillidæ of North America. 54 pp. cuts (Trans. Am. Ent. Soc. 1871)..... .50

83.—Additions to the Synopsis of N. Am. Mutillidæ. 6 pp. (Trans. Am. Ent. Soc. 1872)..... .05

84.—Catalogue of the Mutillidæ of N. Am. with descriptions of new species. 12 pp. (Trans. Am. Ent. Soc. 1879)..... .10

85.—**Cresson,** (E. T.)—Description of a new species of Masaris from the Rocky Mts. 6 pp. 1 pl. (Proc. Ent. Soc. 1863)..... .15

86.—List of the N. Am. species of Bombus and Apathus. 34 pp. (Proc. Ent. Soc. 1863)..... .50

87.—On the N. Am. species of the genus Nomada. 33 pp. (Proc. Ent. Soc. 1863)..... .25

88.—Descriptions of two new species of Masaris. 7 pp. (Proc. Ent. Soc. 1864). .06

89.—Descriptions of two new genera of N. Am. Ichneumodidæ. 6 pp. (Proc. Ent. Soc. 1864)..... .10

90.—Descriptions of new N. Am. Hymenoptera. Ichneumonidæ. 65 pp. (Proc. Ent. Soc. 1864)..... .30

91.—On the N. Am. species of Osmia. 28 pp. (Proc. Ent. Soc. 1864)..... .25

92.—On the N. Am. species of several genera of Apidæ. 38 pp. (Proc. Ent. Soc. 1864)..... .25

93.—On the Hymenoptera of Colorado Territory. Aculeata only. 63 pp. (Proc. Ent. Soc. 1865)..... .25

94.—Monograph of the Philanthidæ of North America. 48 pp. (Proc. Ent. Soc. 1865)..... .30

95.—On the Hymenoptera of Cuba. 200 pp. (Proc. Ent. Soc. 1865)..... 1.00

96.—Descriptions of new species of Mutilla from California. 6 pp. (Proc. Ent. Soc. 1865)..... .06

97.—Descriptions of two new species of Trigonalys. 2 pp. (Trans. Am. Ent. Soc. 1867)..... .05

98.—Notes on the Pompilidæ of N. Am. with descriptions of new species. 66 pp. (Trans. Am. Ent. Soc. 1867)..... .50

99.—Catalogue of a small collection of Hymenoptera made in New Mexico during the summer of 1867. 14 pp. (Trans. Am. Ent. Soc. 1868)..... .10

100.—A list of the Ichneumonidæ of N. Am. with descriptions of new species Parts 1 and 2. 50 pp. (Trans. Am. Ent. Soc. 1867-68)..... .25

101.—Descriptions of N. Am. Bees (Colletes). 7 pp. (Proc. Bost. Soc. 1868).. .10

102.—Catalogue of a collection of Hymenoptera made by F. Sumichrast near Cordova, Mexico. Ichneumonidæ. 38 pp. (Trans. Am. Ent. Soc. 1868)..... .15

Digitized by Google

103.—Descriptions of new Canadian Ichneumonidæ. 5 pp. (Can. Ent. 1868) .10

104.—Descriptions of four new species of Canadian Hymenoptera (Euceros). 2 pp. (Can. Ent. 1869).. ..... .05

105.—Notes on Mexican Pompilidæ with descriptions of new species. 15 pp. (Proc. Bost. Soc. 1869)..... .10

106.—List of N. Am. species of the genus Aleiodes, Wesm. 6 pp. (Trans. Am. Ent. Soc. 1869)..... .10

107.—List of the N. Am. species of Anthophora. Notes on Cuban Hymenoptera with descriptions of new species. 10 pp. (Trans. Am. Ent. Soc. 1869)..... .10

108.—Descriptions of new species belonging to the sub-family Pimplariæ with a list of all known species found in America North of Mexico. 30 pp. (Trans. Am. Ent. Soc. 1870)..... .20

109.—Descriptions of N. Am. Hymenoptera. No. 1 (Mesochorus). 4 pp. (Can. Ent. 1872)..... .10

110.—Descriptions of N. Am. Hymenoptera. No. 2 (Pezomachus). 4 pp. (Can. Ent. 1872)..... .10

111.—Descriptions of N. Am. Hymenoptera. No. 3 (Perilitus). 4 pp. (Can. Ent. 1872)..... .10

112.—Synopsis of the N. Am. species belonging to the genera Leucospis, Smicra and Chalcis. 32 pp. (Trans. Am. Ent. Soc. 1872)..... .25

113.—Hymenoptera Texana. 140 pp. (Trans. Am. Ent. Soc. 1872)..... ..... .75

114.—Description of a new species of Masaris from California. 2 pp. (Trans. Am. Ent. Soc. 1872)..... .05

115.—Descriptions of Mexican Ichneumonidæ. 130 pp. (Proc. Acad. Nat. Sci. 1873)..... .50

116.—Descriptions of new Hymenoptera. 4 pp. (Trans. Am. Ent. Soc. 1874). .06

117.—List of Hymenoptera collected by J. Duncan Putnam, of Davenport, Iowa, with descriptions of two new species. 6 pp. 1 pl. (Proc. Dav. Acad. 1876).. ..... .10

118.—Notes on the species belonging to the sub-family Ichneumonides found in America north of Mexico. 84 pp. (Trans. Am. Ent. Soc. 1877)..... .50

119.—Descriptions of new Ichneumonidæ (Mesostenus). 6 pp. (Can. Ent. 1878)..... .10

120.—Descriptions of Ichneumonidæ chiefly from the Pacific Slope of the U. S. and Brit. Am. 34 pp. (Proc. Acad. Nat. Sci. 1878)..... .20

121.—Description of new species of N. Am. Hymenoptera belonging to the family Evaniidæ. 2 pp. (Trans. Am. Ent. Soc. 1879)..... .05

122.—Catalogue of North American Apidæ with descriptions of new species. 108 pp. (Trans. Am. Ent. Soc. 1879)..... .50

123.—Catalogue of the Tenthredinidæ and Urocerida of N. Am. with descriptions of new species. 68 pp. (Trans. Am. Ent. Soc. 1880)..... .25

124.—Descriptions of species belonging to the genus Nysson inhabiting N. Am. 12 pp. (Trans. Am. Ent. Soc. 1882).. ..... .15

125.—On the species belonging to the genus Eucerceris. 4 pp. (Trans. Am. Ent. Soc. 1882)..... .10

126.—**Cresson** and **Norton.**—Report upon the collections of Hymenoptera made in portions of Nevada, Utah, Colorado, New Mexico and Arizona, during the years 1872 and 1874. 32 pp. 2 colored plates, 4to, 1875..... .50

Digitized by Google

127.—On the Tenthredinidæ and Uroceridæ of North America (composed of Norton's descriptive Catalogue 1867-69, and of Cresson's Catalogue and descriptions of new species 1880). 290 pp..... 1.50

128.—**Dahlbom.**—Hymenoptera Europæa. Vol. 1, Sphex. Vol. 2, Chrysis, 12 plates. Half roan and boards..... 2.75

129.—Crabronibus Scandinavicie. 1839-40. 104 pp., 5 colored plates, paper, gilt edge..... 1.00

130.—**Foerster.**—Hymenopterologische Studien. Formicariæ. 1850. 74 pp..... .50

131.— Idem. Chalcididæ und Proctotrupii, 1856. 152 pp..... .75

132.—**McCook,** (H. C.)—Notes on the Architecture and Habits of Formica Pennsylvania—the Pennsylvania Carpenter Ant. 16 pp. 3 plates (Trans. Am. Ent. Soc. 1876)..... .25

133.—Mound-making Ants of the Alleghenies, their Architecture and Habits. 44 pp. 5 plates (Trans. Am. Ent. Soc. 1877)..... .50

134.—**Norton,** (Edw.)—On the synonyms of Cimbex americana. 2 pp. (Proc. Ent. Soc. 1862)..... .06

135.—Notice of several new species of Tenthredinidæ. 2 pp. (Proc. Ent. Soc. 1862)..... .06

136.—Catalogue of our species of Ophion, Anomalon, Paniscus and Camposplex. 12 pp. (Proc. Ent. Soc. 1863)..... .15

137.—Notes on Tenthredinidæ, with descriptions of new species. 12 pp. (Proc. Ent. Soc. 1864)..... .10

138.—Notes on N. Am. Tenthredinidæ with descriptions of new species. 10 pp. (Trans. Am. Ent. Soc. 1872)..... .10

139.—On the Chrysides of North America. 10 pp. (Trans. Am. Ent. Soc. 1879)..... .10

140.—**Osten Sacken,** (R.)—On the Cynipidæ of the N. Am. Oaks and their Galls. 45 pp. (Proc. Ent. Soc. 1861-62)..... .50

141.—Contributions to the Natural History of the Cynipidæ of the U. S. and of their Galls. Article 3d. 17 pp. (Proc. Ent. Soc. 1863)..... .10

142.— Idem. Article 4th. 50 pp. (Proc. Ent. Soc. 1865)..... .30

143.—**Packard,** (A. S. Jr.)—Revision of the Fossorial Hymenoptera of N. Am. (Crabronidæ and Nyssonidæ). 170 pp. (Proc. Ent. Soc. 1866-67)..... 1.00

144.—**Radoszkoosky** et **Sichel.**—Monographie des Mutilles. 1870, 6 colored plates. Roan and boards..... 2.50

145.—**Saussure,** (H. de)—Catalogus Specierum Generis Scolia 350 pp. 2 colored plates. Paris, 1864..... 1.50

146.—Mélanges Hyménoptérologiques, IIme Fasc. 74 pp. 1 plate. 4to, 1863. .75

147.—Hyménoptères (Scolides) Voyage au Turkistan. 1880, 44 pp. 2 finely colored plates..... 1.00

148.—**Saussure** et **Sichel.**—Catalogue des Scolia. 1864, 2 colored plates. (Roan and boards; a litttle worn)..... 2.00

149.—**Sumichrast,** (F.)—Notes on the Habits of the Mexican species of the genus Ecition with desctiptions of new species by E. Norton. 8 pp. (Trans. Am. Ent. Soc. 1868)..... .10

150.—**Walker,** (F.)—A list of Hymenoptera collected by J. K. Lord, in Egypt, in the neighborhood of the Red Sea and in Arabia with descriptions of new species. 62 pp. 1871..... .50

Digitized by Google

151.—**Walsh,** (B. D.)—On Dimorphism in the Hymenopterous genus Cynips, with descriptions of new species. 58 pp. (Proc. Ent. Soc. 1864). .50
152.—Descriptions of N. Am. Hymenoptera with notes by E. T. Cresson 100 pp. (Trans. St. Louis Acad. 1873)..... .50

LEPIDOPTERA.

153.—**Behr,** (H.)—Synopsis Noctuidarum hucusque in California repertarum. 6 pp. (Trans. Am. Ent. Soc. 1870)..... .10
154.—Description of a new genus of Pieridæ and certain new species of butterflies from California. 2 pp. (Trans. Am. Ent. Soc. 1869)..... .05
155.—**Blake,** (C. A.)—Description of a supposed new genus and species of Saturniidæ from the Rocky Mountains. 1 p. 1 pl. (Proc. Ent. Soc. 1863)..... .08
156.—**Clemens,** (B.)—North American Micro-Lepidoptera. 4 pp. (Proc. Ent. Soc. 1862)..... .06
157.—American Micro-Lepidoptera. 11 pp. (Proc. Ent. Soc. 1863)..... .10
158.—North American Micro-Lepidoptera. 16 pp. (Proc. Ent. Soc. 1864)..... .10
159.—North American Micro-Lepidoptera. 15 pp. (Proc. Ent. Soc. 1865)..... .10
160.—Notes on Thyridopteryx Ephemeræformis. 2 pp. (Proc. Ent. Soc. 1866)..... .05
161.—**Edwards,** (H.)—Pacific Coast Lepidoptera. Nos. 1–3. 25 pp. (Proc. Cala. Acad. 1873)..... .20
162.—**Edwards,** (W. H.)—Descriptions of certain species of Diurnal Lepidoptera found within the limits of the U. S. and Brit. Am. 5 pp. (Proc. Acad. Nat. Sci. 1861)..... .08
163.— Idem. No. 3. 6 pp. 1862..... .08
164.—Notes upon Grapta comma, Harris, and Grapta faunus, Edw., C-album of some authors. 4 pp. (Proc. Ent. Soc. 1862)..... .06
165.—Description of certain species of Diurnal Lepidoptera found within the U. S. and Brit. Am. No. 2. 6 pp. (Proc. Ent. Soc. 1863)..... .08
166.—Description of certain species of Diurnal Lepidoptera found within the limits of the U. S. and Brit. Am. No. 3. Description of certain species of Catocala found in the U. S. 12 pp. (Proc. Ent. Soc. 1864)..... .10
167.—Description of the female of Argynnis Diana. Notes on the Argynnides of California. 6 pp. (Proc. Ent. Soc. 1864)..... .08
168.—Notes upon Papilio Asterias and Saturnia promethea hermaphrodites 1 p. (Proc. Ent. Soc. 1865)..... .05
169.—On certain N. Am. species of Satyrus. Description of certain species of Diurnal Lepidoptera, No. 5. Description of a new species of Chrysophanus, by H. Behr., 14 pp. (Proc. Ent. Soc. 1866)..... .10
170.—Description of certain species of Diurnal Lepidoptera found in the U. S. 3 pp. 1 pl. (Trans. Am. Ent. Soc. 1867)..... .10
171.—Notes on a remarkable variety of Papilio turnus and descriptions of two new species of Diurnal Lepidoptera, 4 pp. (Trans. Am. Ent. Soc. 1868). .06
172.—Descriptions of certain species of Diurnal Lepidoptera found in the U. S. 2 pp. (Trans. Am. Ent. Soc. 1869)..... .05
173.—Descriptions of new species of Diurnal Lepidoptera found within the U. S. 8 pp. (Trans. Am. Ent. Soc. 1869)..... .10

Digitized by Google

174.—Notes on Grapta C-aureum and interrogationis. Descriptions of new species of Diurnal Lepidoptera found within the U. S. 20 pp. (Trans. Am. Ent. Soc. 1870) ..... .15

175.—Descriptions of new N. Am. Diurnal Lepidoptera. 8 pp. (Trans. Am. Ent. Soc. 1870) ..... .10

176.—Descriptions of new species of Diurnal Lepidoptera found within the U. S. Descriptions of new species of N. Am. Butterflies. 24 pp. (Trans. Am. Ent. Soc. 1871) ..... .15

177.—Descriptions of new species of Diurnal Lepidoptera found within the U. S. 10 pp. (Trans. Am. Ent. Soc. 1872) ..... .10

178.—Synopsis of N. Am. Butterflies. 52 pp. 4to. 1872 ..... .25

179.—Descriptions of Diurnal Lepidoptera found within the U. S. 6 pp. (Trans. Am. Ent. Soc. 1873) ..... .06

180.—Descriptions of new species of Diurnal Lepidoptera found in N. Am. 7 pp. (Trans. Am. Ent. Soc. Feb. 1874) ..... .08

181.—Description of new species of Diurnal Lepidoptera found in N. Am. Description of a new species of Catocala from Arizona. 10 pp. (Trans. Am. Ent. Soc. Oct. 1874) ..... .10

182.—New species of Diurnal Lepidoptera. 4 pp. (Trans. Am. Ent. Soc. 1876). .05

183.—Catalogue of the Diurnal Lepidoptera of America north of Mexico 68 pp. 1877 ..... .25

184.—Descriptions of new species of Diurnal Lepidoptera found within the U. S. Notes on the species of Callidryas found within the U. S. 14 pp. (Trans. Am. Ent. Soc. 1881) ..... .15

185.—Revised Catalogue of the Diurnal Lepidoptera of America north of Mexico 96 pp. (Trans. Am. Ent. Soc. 1884) 1.00

186.—**Fernald,** (C. H.)—A synonymical catalogue of the described Tortricidæ of America north of Mexico. Descriptions of new species of Tortricidæ. 72 pp. (Trans. Am. Ent. Soc. 1882.) ..... .65

187.—**Grote,** (A. R.)—Additions to the Catalogue of U. S. Lepidoptera. 2 pp. (Proc. Ent. Soc. 1862) ..... .06

188.—Additions to the Catalogue of U. S. Lepidoptera, No. 2. 3 pp. 1 col. pl. (Proc. Ent. Soc. 1863) ..... .10

189.—Additions to the Catalogue of U. S. Lepidoptera, No. 3. A revision of the species of Cymatophorina found in the U. S. and Brit. Am. with descriptions of new species. 9 pp. 1 col. pl. (Proc. Ent. Soc. 1863) .... .20

190.—Additions to the Catalogue of U. S. Lepidoptera, No. 4. 5 pp. 1 col. pl. (Proc. Ent. Soc. 1863) ..... .15

191.—Descriptions of N. Am. Lepidoptera, No. 1. 12 pp. 1 pl. (Proc. Ent. Soc. 1863) ..... .15

192.—Descriptions of N. Am. Lepidoptera, No. 6. 16 pp. 1 pl. (Proc. Ent. Soc. 1865) ..... .20

193.—Notes on the Bombycidæ of Cuba. 30 pp. 1 pl. (Proc. Ent. Soc. 1865). .25

194.—Notes on the Zygænidæ of Cuba. Part 1. 17 pp. (Proc. Ent. Soc. 1866). .15

195.—Notes on the Zygænidæ of Cuba. Part 2. 38 pp. 1 pl. (Proc. Ent. Soc. 1867) ..... .25

196.—On the Synonomy, etc., of certain species of American Lepidoptera. 8 pp. (Trans. Am. Ent. Soc. 1868) ..... .10

197.—On the N. Am. Platypteryginæ. 3 pp. (Trans. Am. Ent. Soc. 1868) ..... .05

Digitized by Google

198.—On the structural characters of Polyommatus tarquinius. On a new genus of Noctuidæ allied to Dyops, with remarks on certain species of Agrotis. 4 pp. (Trans. Am. Ent. Soc. 1869) ..... .08

199.—List of the Sphingidæ, Ægeriidæ, Zygænidæ and Bombycidæ of Cuba. 6 pp. (Trans. Am. Ent. Soc. 1870) ..... .10

200.—Descriptions of N. Am. Noctuidæ, No. 2. 20 pp. (Trans. Am. Ent. Soc. 1872) ..... .15

201.—Descriptions of N. Am. Noctuidæ, No. 3. 16 pp. 1 pl. (Trans. Am. Ent. Soc. 1873) ..... .15

202.—On the Noctuidæ of N. Am. 18 pp. 1873 ..... .10

203.—List of the N. Am. Platypterices, Attaci, Hemileucini, Ceratocampadæ, Lachneides, Teredines and Hepiali, with notes. 10 pp. (Proc. Am. Philos. Soc. 1874) ..... .10

204.—Supplement to the List of N. Am. Noctuidæ. 16 pp. 1875 ..... .10

205.—Remarks upon the N. Am. Heliothinæ and their recent literature. 12 pp. (Trans. Am. Ent. Soc. 1883) ..... .10

206.—**Grote** and **Robinson.**—Lepidopterological Notes and Descriptions, No. 1. 8 pp. 1 pl. (Proc. Ent. Soc. 1865) ..... .15

207.—Lepidopterological Notes and Descriptions No. 2. 30 pp. 4 plates. (Proc. Ent. Soc. 1866.) ..... .50

208.—Notes on the Lepidoptera of America. 35 pp. 2 plates. 20 fig. New York, 1867 ..... .50

209.—Descriptions of American Lepidoptera No. 1. 30 pp. 2 pl. 1867 ..... .35

210.—Descriptions of American Lepidoptera No. 2. 22 pp. 1 pl. 1867 ..... .30

211.—Descriptions of American Lepidoptera No. 3. 38 pp. 2 pl. 1868 ..... .50

212.—Descriptions of American Lepidoptera No. 4. 26 pp. 2 pl. 1868 ..... .50

213.—List of the Lepidoptera of N. Am. Part 1, containing the Sphingidæ, Ægeriidæ, Thyridæ, Zygænidæ and Bombycidæ. 16 pp. 1868 ..... .10

214.—Notes on the N. Am. Lepidoptera in the collection of the British Museum, and described by Mr. Francis Walker. 24 pp. 1868 ..... .15

215.—Notes on American Tortricidæ. 28 pp. 6 plates. (Trans. Am. Ent. Soc. 1869) ..... .35

216.—Remarks on Dr. Bosiduval's "Lepidopteres de la Californie." Descriptions of American Lepidoptera No. 5. 10 pp. 1 pl. (Trans. Am. Ent. Soc. 1870) ..... .25

217.—A Supplement to the Descriptions of American Lepidoptera. 12 pp. (Trans. Am. Ent. Soc. 1873) ..... .10

218.—**Harvey,** (L. F.)—Rectifications of Treitschke's use of Hübner's generic term "Cymatophora." 4 pp. 1874 ..... .06

219.—**Kellicott,** (D. S.)—A new Gall Moth, and Notes on Larvæ of other Gall Moths. 4 pp. cuts. (Can. Ent. 1878) ..... .06

220.—**Lintner,** (J. A.)—Notes on some of the Diurnal Lepidoptera of the State of New York, with descriptions of their Larvæ and Chrysalides. 15 pp. (Proc. Ent. Soc. 1864) ..... .10

221.—Notes on some Sphingidæ of the State of New York, with descriptions of their Larvæ and Pupæ. 28 pp. (Proc. Ent. Soc. 1864) ..... .20

222.—Description of a new species of Grapta, and notes on G. interrogationis. 8 pp. (Trans. Am. Ent. Soc. 1869) ..... .10

223.—On Graptæ interrogationis and Fabricii of Edwards. 8 pp. (Trans. Am. Ent. Soc. 1870) ..... .10

Digitized by Google

224.—**Morris,** (J. G.)—Catalogue of the described Lepidoptera of N. Am. 76 pp. 1860 .... .50

225.—Synopsis of the described Lepidoptera of N. Am. Part 1. Diurnal and Crepuscular Lepidoptera. 386 pp. 1862. ..... 1.50

226.—**Packard,** (A. S. Jr.)—Synopsis of the Bombycidæ of the U. S. 100 pp. (Proc. Ent. Soc. 1864)..... .50

227.—Geometrid Moths (Hayden's Surveys) cloth, many plates..... 1.50

228.—**Reakirt,** (T.)—Notes on Central American Lepidoptera, with descriptions of three new species. 16 pp. (Proc. Ent. Soc. 1863)..... .10

229.—Descriptions of three new species of Limacodes. 4 pp. (Proc. Ent. Soc. 1864) ..... .06

230.—Notes upon Exotic Lepidoptera chiefly from the Philippine Islands, with descriptions of some new species. 62 pp. (Proc. Ent. Soc. 1864).. .25

231.—Descriptions of some new species of Danainæ. Descriptions of some new species of Eresia. 10 pp. (Proc. Ent. Soc. 1865)..... .10

232.—Observations upon some American Pierinæ. 6 pp. (Proc. Ent. Soc. 1865)..... .10

233.—Coloradian Butterflies. 30 pp. (Proc. Ent. Soc. 1866)..... .25

234.—**Robinson,** (C. T.)—List of N. Am. Tortricidæ. Part 1. New York, 1869. 4 pp..... .06

235.—**Scudder,** (S. H.)—Revision of the hitherto known species of the genus Chionobas in N. Am. 28 pp. (Proc. Ent. Soc. 1865)..... .15

236.—The Species of the Lepidopterous genus Pamphila. 2 plates (Mem. Bost. Soc. Nat. Hist. 1874)..... .75

237.—Antigeny, or Sexual Dimorphism in Butterflies. 9 pp. 1877..... .10

238.—On the Classification of the Butterflies with special reference to the Position of the Equites or Swallow-tails. 12 pp. (Trans. Am. Ent. Soc. 1877)..... .10

239.—**Smith,** (John B.)—Synopsis of the N. Am. Heliothinæ. 50 pp. 2 plates (Trans. Am. Ent. Soc. 1882)..... .35

240.—Notes on the systematic position of some N. Am. Lepidoptera. 8 pp. 1 plate (Trans. Am. Ent. Soc. 1885)..... .10

241.—**Walsingham,** (Lord)—Notes on Tineidæ of N. Am. 38 pp. (Trans. Am. Ent. Soc. 1882)..... .20

242.—**Weidemeyer,** (J. W.)—Catalogue of N. Am. Butterflies. 42 pp. (Proc. Ent. Soc. 1863.)..... .20

MISCELLANEOUS.

243.—**Aaron,** (S. F.)—Description of new Psocidæ. 4 pp. 1 plate (Trans. Am. Ent. Soc. 1883)..... .10

244.—**Buckley,** (S. B.)—The Tarantula and its Destroyer. 2 pp. (Proc. Ent. Soc. 1862)..... .05

245.—**Burgess,** (Edward)—The anatomy of the head and the structure of the maxilla in the Psocidæ. 5 pp. 1 pl. 1878..... .20

246.—**Chenu.**—Encyclopedie D'Hist. Nat. Annelés. Woodcuts. Half roan. 2.00

247.—**Charpentier.**—Libellulæ Europaea. 48 colored plates. 1840. Half morocco (with Society's stamp)..... 5.00

248.—**Cope,** (E. D.)—On some new and little known Myriapoda from the Southern Alleghenies. 3 pp. (Trans. Am. Ent. Soc. 1870)..... .05

Digitized by Google

249.—**Couper,** (W.)—Importance of Insect Architecture to Entomologists. Remarks on Tent-building Ants. 5 pp. (Proc. Ent. Soc. 1863)..... .06

250.—**DeSelys-Longchamps,** (E.)—Synopsis des Gomphines. 93 pp. 1854..... .50

251.—Synopsis des Caloptérygines. 73 pp. 1853..... .50

252.—Monographie des Gomphines. 460 pp. 23 plates. 1858..... 2.50

253.—**Edwards,** (W. H.)—Some remarks on Entomological Nomenclature. 16 pp. 1873..... .10

254.—**Fallen.**—Diptera Sveciæ. 2 vols. 1818–25. Half morocco..... 1.50

255.—**Fitch,** (Asa)—Report on the Noxious Insects of New York, parts 1 and 2 in one vol. 1856. Black cloth..... 2.00

256.—**Grote,** (A. R.)—Description of two new species of N. Am. Brachycerous Diptera. 1 p. (Proc. Ent. Soc. 1867)..... .05

257.—**Hagen** and **Walsh.**—Observations on certain N. Am. Neuroptera by H. Hagen, with notes and descriptions of new N. Am. species of Pseudoneuroptera by B. D. Walsh. 106 pp. (Proc. Ent. Soc. 1863)..... .50

258.—**LeConte,** (J. L.)—Hints for the promotion of Economic Entomology in the U. S. 30 pp. 1873..... .15

259.—**Loew,** (H.)—Monograph of the Diptera of N. Am. Part 1. 246 pp. 2 plates. 1862..... 1.50

260.— Idem. Part 2. 372 pp. 5 plates. 1864..... 2.00

261.—**Osten Sacken,** (R.)—Catalogue of the described Diptera of N. Am. 112 pp. 1858..... .30

262.— Idem. Bound in calf and interleaved (a little worn),..... .75

263.—Description of several new N. Am. Ctenophoræ. 5 pp. (Proc. Ent. Soc. 1864)..... .10

264.—Description of some new genera and species of N. Am. Limnobnia. 18 pp. (Proc. Ent. Soc. 1865)..... .15

265.—Two new N. Am. Cecidomyiæ. 2 pp. (Proc. Ent. Soc. 1866)..... .05

266.—Description of a new species of Culicidæ. 2 pp. (Trans. Am. Ent. Soc. 1868) ..... .05

267.—Monograph of the Diptera of N. Am. Part 4. 358 pp. 4 plates, 1869. 2.00

268.—Biologica. Notes on Diptera (Galls on Solidago). 5 pp. (Trans. Am. Ent. Soc. 1869)..... .06

269.—Biological Notes on Diptera (Article 2d). Contributions to the Natural History of the Cynipidæ of the U. S. and their Galls (Article 5th). 14 pp. (Trans. Am. Ent. Soc. 1870)..... .10

270.—Biological Notes on Diptera (Article 3d). 3 pp. (Trans. Am. Ent. Soc. 1871) ..... .05

271.—**Ord,** (Geo.)—A Memoir of Thomas Say (read before the American Philosophical Society December, 1834)..... .10

272.—**Packard,** (A. S. Jr.)—On certain Entomological Speculations—A Review. 10 pp. (Proc. Ent. Soc. 1866)..... .10

273.—**Saussure,** (H. de)—Mélanges Orthoptérologiques, Mantides et Blattides. 164 pp. 3 plates, 4to, 1872..... 2.50

274.—Mélanges Orthoptérologiques, Gryllides. 504 pp. 5 plates, 4to, 1877.... 3.50

275.—Memoires L'Hist. Nat. Mexique des Antilles et des Etats Unis Orthopteres, Blattides. 279 pp. 2 colored plates, 4to, 1864–65..... 3.00

276.—Orthoptères, "Voyage au Turkestan." 52 pp. 1 colored plate, 1874..... .75

Digitized by Google

277.—**Scudder,** (S. H.)—Catalogue of the Orthoptera of N. Am. described previous to 1867. 90 pp. 1868..... .75

278.—Revision of the Large Stylated Fossorial Crickets. 32 pp. 1 pl. 1869. .50

279.—Descriptions of some new species of Orthoptera. 3 pp. (Trans. Am. Ent. Soc. 1869)..... .05

280.—List of Orthoptera collected by A. S. Packard in the Western U. S. in 1877. 6 pp. 1 pl..... .20

281.—**Shimer,** (H.)—Description of a new species of Aleyrodes. Description of a new species of Cecidomyia. On a new genus of Aphidæ. 5 pp. (Trans. Am. Ent. Soc. 1867)..... .06

282.—On a new genus of Homoptera. 9 pp. (Proc. Acad. Nat. Sci. 1867)..... .10

283.—Notes on the Apple Bark Louse, with a description of a supposed new Acarus. 14 pp. (Trans. Am. Ent. Soc. 1868)..... .10

284.—Notes on Insects bred from the Prickly Ash. 3 pp. (Trans. Am. Ent. Soc. 1868)..... .05

285.—Descriptions of two Acarians bred from the White Maple. 2 pp. (Trans. Am. Ent. Soc. 1869)..... .05

286.—Notes on Chermes pinicorticis (White Pine Louse). A summer's study of Hickory Galls, with descriptions of supposed new insects bred therefrom. 16 pp. (Trans. Am. Ent. Soc. 1869)..... .10

287.—**Stephens.**—Illustrations of British Entomology. 11 vols. complete, with Supplement. (Many finely colored plates. Imitation morocco and cloth, many pages uncut and in good condition, the binding strong, but a little worn)..... 18.00

288.—**Uhler,** (P. R.)—Descriptions of a few new species of Hemiptera and observations upon some already described. 4 pp. (Proc. Ent. Soc. 1861)..... .06

289.—Hemipterological Contributions No. 1. 8 pp. (Proc. Ent. Soc. 1863)..... .10

290.—Hemipterological Contributions No. 2. 6 pp. (Proc. Ent. Soc. 1863)..... .10

291.—Orthopterological Contributions. 13 pp. (Proc. Ent. Soc. 1864)..... .10

292.—**Walsh,** (B. D.)—On certain Entomological Speculations of the New England School of Naturalists. 43 pp. (Proc. Ent. Soc. 1864) ..... .30

293.—On the Pupa of the Ephemerinous genus Bætisca. 8 pp. (Proc. Ent. Soc. 1864)..... .10

294.—On the Insects, Coleopterous, Hymenopterous and Dipterous, inhabiting the Galls of certain species of Willow. Part 1. Diptera. 104 pp. (Proc. Ent. Soc. 1864)..... .50

295.— Idem. Part 2 and last. 66 pp. (Proc. Ent. Soc. 1866)..... .25

296.—On Phytophagic Varieties and Phytophagic Species. 28 pp. (Proc. Ent. Soc. 1864)..... .20

297.—On Phytophagic Varieties and Phytophagic Species, with remarks on the Unity of Coloration in Insects. 23 pp. (Proc. Ent. Soc. 1865)... .20

298.—On Prof. Dana and his Entomological Speculations. 6 pp. (Proc. Ent. Soc. 1866)..... .10

299.—**Williston,** (S. W.)—On the N. Am. Asilidæ (Dasypogoninæ, Laphrinæ) with a new genus of Syrphidæ. 36 pp. 2 plates (Trans. Am. Ent. Soc. 1883) ..... .35

300.—On the N. Am. Asilidæ, part 2. 24 pp. (Trans. Am. Ent. Soc. 1885)..... .15

Digitized by Google

301.—**Proceedings** of the Entomological Society of Philadelphia. Vols. 2–6. (vol. 1 out of print)..... 20.00
302.— Idem. Vol. 1, half morocco; rare..... 15.00
303.— Idem. Vol. 4, 1865, morocco and boards, a little worn..... 4.00
304.— Idem. Vol. 5, 1865, roan and boards..... 3.50
305.— Idem. Vol. 6, 1866–67, roan and boards..... 3.50
306.— Idem. 6 vols. complete, and **Transactions** first 6 vols. making 12 vols., 1861–77, finely bound in half morocco, with colored plates, a unique and valuable set, same as new..... 76.00
307.—**Transactions** of the American Entomological Society. Vols. 1–12 (vol. 12 in press) each..... 4.00
308.— Idem. The set of 11 vols. complete..... 40.00
309.—**Practical Entomologist.**—Vols. 1 and 2 unbound..... .75
310.— Idem. Vol. 1. Cloth..... 1.00
311.—**American Entomologist and Botanist.**—(1870) Bound. 1.50
312.—**Gardiner's Magazine** and Register of Rural and Domestic Improvement. Conducted by J. C. Louden, F. L. S. 19 vols. 8vo, bound. 1826–43. Profusely illustrated with wood cuts and colored plates. (Rare)..... 20.00
313.—**Horae** Societatis Entomologicae Rossicae. Vol. 15, 1879, 20 plates, unbound..... 1.50
314.—**Proceedings** of the Davenport Academy of Natural Sciences. Containing papers on Entomology by Cresson, Thomas, Putnam and others. Vol. 1. 1867–76. New. Black cloth. Plates colored..... 2.00
315.— Idem. Unbound. Plates uncolored..... 1.50
316.—**Entomologische Zeitung** zu Stettin. 1882. 2 plates..... 1.50
317.— Idem. 1883. (with portrait of Prof. Zeller)..... 1.50

☞ All orders for publications given in this list must be accompanied with the amount specified, otherwise they will not be forwarded.

☞Remittances by mail *at the risk of the sender*, unless in form of Post Office Money Order, or draft on Philadelphia or New York, payable to the order of

E. T. CRESSON, Treasurer,
P. O. Box 1577,
PHILADELPHIA, PA.

Digitized by Google

236. sphæricollis *Say.*
237. edentulus *Putz.*
238. truncatus *Lec.*
239. erythrocerus *Lec.*
240. marinus *Lec.*
241. obesus *Lec.*
242. sellatus *Lec.*
243. pallipennis *Say.*
244. salivagans *Lec.*
245. curvispinus *Putz.*
246. montanus *Lec.*
247. filiformis *Lec.*
248. sublævis *Putz.*
249. aratus *Lec.*
250. pumilus *Dej.*
251. abbreviatus *Putz.*
252. pilosus *Lec.*
253. hispidus *Lec.*
254. setosus *Lec.*
255. frigidus *Mann.*
256. transmarinus *Mann.*

Clivina Lat.

257. dentipes *Dej.*
258. impressifrons *Lec.*
259. texana *Lec.*
260. planicollis *Lec.*
261. punctulata *Lec.*
262. punctigera *Lec.*
263. rubicunda *Lec.*
264. pallida *Say.*
265. rufa *Lec.*
266. collaris *Hbst.*
267. analis *Putz.*
268. americana *Dej.*
269. morula *Lec.*
270. cordata *Putz.*
271. striatopunctata *Dej.*
272. ferrea *Lec.*
273. convexa *Lec.*
274. bipustulata *Fab.*
275. marginipennis *Putz.*
276. postica *Lec.*
277. stigmula *Putz.*
278. sulcipennis *Putz.*

Aspidoglossa Putz.

279. subangulata *Chd.*

Schizogenius Putz.

280. crenulatus *Lec.*
281. planulatus *Lec.*
282. lineolatus *Say.*
283. Sallei *Putz.*
284. ferrugineus *Putz.*
285. amphibius *Hald.*
286. depressus *Lec.*
287. pluripunctatus *Lec.*

Ardistomis Putz.

288. obliquata *Putz.*
289. Schaumii *Lec.*
290. morio *Dej.*
291. viridis *Say.*
292. puncticollis *Putz.*

Panagæus Lat.

293. Sallei *Chd.*
294. crucigerus *Say.*
295. fasciatus *Say.*

Micrixys Lec.

296. distinctus *Hald.*

Pachyteles Perty.

297. testaceus *Horn.*
298. parca *Lec.*

Nomius Lap.

299. pygmæus *Dej.*

Psydrus Lec.

300. piceus *Lec.*

Morio Lat.

301. monilicornis *Lat.*

Tachypus Még.

302. elongatus *Mots.*

Bembidium Lat.

Amerizus Chd.
Lymnæum Steph.
303. punctatostriatum *Say.*
304. carinula *Chd.*
impressum ‡ *Lec.*
305. Lorquinii *Chd.*
306. paludosum *Sturm.*

Digitized by Google

Scaptolenus Lec.

4535. Lecontei *Sallé.*
4536. ocreatus *Horn.*
4537. estriatus *Lec.*

Perothops Er.

4538. mucida *Gyll.*
4539. Witticki *Lec.*
—— cervina *Lac.*

Cerophytum Lat.

4540. convexicolle *Lec.*
4541. pulsator *Hald.*

THROSCIDÆ.

Drapetes Redt.

4542. geminatus *Say.*
4543. 4-pustulatus *Bonv.*
4544. nitidus *Melsh.*
4545. rubricollis *Lec.*

Throscus Lat.

4546. validus *Lec.*
4547. punctatus *Bonv.*
4548. invisus *Horn.*
4549. constrictor *Say.*
calocerus *Bonv.*
4550. alienus *Bonv.*
4551. convergens *Horn.*
4552. pugnax *Horn.*
4553. Chevrolati *Bonv.*
4554. mendax *Horn.*
4555. sejunctus *Horn.*
4556. parvulus *Lec.*
4557. sericeus *Lec.*
4558. debilis *Horn.*

Pactopus Lec.

4559. Hornii *Lec.*

BUPRESTIDÆ.

Gyascutus Lec.

4560. planicosta *Lec.*
4561. obliteratus *Lec.*
4562. carolinensis *Horn.*
4563. cuneatus *Horn.*

Hippomelas Lap. & Gory.

4564. sphenicus *Lec.*
4565. cælatus *Lec.*
4566. californicus *Horn.*

Halecia Lap. & Gory.

4567. gentilis *Horn.*

Chalcophora Sol.

4568. angulicollis *Lec.*
4569. virginiensis *Drury.*
4569*a*. lacustris *Lec.*
4570. liberta *Germ.*
4571. georgiana *Lec.*
4572. fortis *Lec.*
4573. campestris *Say.*
4574. Fulleri *Horn.*

Psiloptera Sol.

4575. Drummondi *Lap. & Gory.*
4575*a*. Webbii *Lec.*

Dicerca Esch.

4576. prolongata *Lec.*
4577. divaricata *Say.*
4578. pugionata *Germ.*
4579. obscura *Fab.*
4579*a*. lurida *Fab.*
4580. lepida *Lec.*
4581. spreta *Gory.*
4582. asperata *Lap. & Gory.*
4583. tenebrosa *Kirby.*
4583*a*. chrysea *Melsh.*
4584. californica *Cr.*
4585. tuberculata *Chev.*
4586. lugubris *Lec.*
4587. sexualis *Cr.*
4588. punctulata *Sch.*
4589. pectorosa *Lec.*
4590. Hornii *Cr.*
4591. mutica *Lec.*

Digitized by Google

A New List of Coleoptera.

The Crotch Check-List of North American Coleoptera (Salem, 1873) and the Supplement to the same (Boston, 1880) having proved a great aid as a means of interchange among Coleopterists, **The American Entomological Society**, recognizing the need of a new list well up to date, propose publishing about Sept. 1, 1885,

A list of the Coleoptera of America

North of Mexico,

by **Samuel Henshaw.** The arrangement of the families and genera is in accordance with the classification of Drs. LeConte and Horn, the species following according to the most recent synopses. The species and varieties are numbered; synonyms (generic and specific) are inserted only when necessary to connect the present with previous lists.

The list proper closes with a catalogue of the species accredited erroneously to the fauna of North America, and a full index of genera.

In the compilation of the list the author has had the aid of the leading authority on American beetles, **Dr. George H. Horn,** whose suggestions as to the validity and position of many species gives the list an authority it could not otherwise possess.

The whole will make a pamphlet of about 160 pages; a specimen page is annexed. **Price, $1.25 per copy.**

Those desiring the "List" will send their names and the number of copies desired. **The edition is limited.**

Digitized by Google

GEO. B. CRESSON,

STEAM-POWER PRINTER,

55 N. SEVENTH STREET,

PHILADELPHIA, PA.

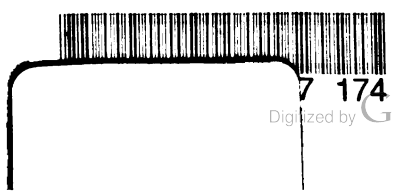
Digitized by Google

Digitized by Google

Digitized by Google

Date Due

APR 24



7 174

Digitized by Google

Digitized by Google